

The Role of Natural Resources in Fundamental Tax Reform in the Russian Federation

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Abstract

The Russian Federation has one of the richest natural resource endowments in the world. Despite their importance in the Russian economy, natural resources do not contribute as much as they could to public revenues. Large resource rents (excess payments, or above-normal profits generated by natural resources in scarce supply) are dissipated through subsidies and wastage, or appropriated by private interests. Failure to tax this rent means that taxes must be levied elsewhere (on capital and labor) to sustain revenues, thereby depressing investment and employment, or that potential revenues are foregone. Failure to reinvest rent means that Russia perpetuates the tradition of exporting low value-added raw materials and excessive capital outflows, and retards its transition to sustainable economic development.

Bosquet provides estimates of the average and total current rent on crude oil, natural gas, and round wood in Russia. The sum of appropriated rent on oil and gas was estimated at US\$9 billion in 1999 (in excess of \$15 billion in 2000), or about 18 percent of consolidated tax revenues. The appropriated rent on round wood was estimated at US\$191–1,032 million.

A more appropriate natural resource taxation system would enhance the fiscal role of natural resources as well as create better incentives for resource conservation and environmental protection. Two conditions further reinforce the appeal of such a reform. First, the state still

owns most of the natural resources, which theoretically facilitates change in resource pricing and taxation. Second, the cost of adjusting the tax system is relatively low at this time since Russian tax policy is undergoing thorough reform.

Increasing rent taxation should be relatively straightforward since the system already exists. What mainly needs to be done is to differentiate the fees to reflect objective rent-generating conditions by withdrawing the rent and imposing higher taxes on profitable resource deposits. A seemingly desirable instrument—true differentiation of rental payments—does not exist in Russia despite legislative provisions that it should. Several natural resource taxes are specific taxes (set per volume), regardless of the market price or production cost. Such taxes favor profitable deposits and penalize marginal ones.

The author's study should be given serious consideration in the renewed debate on tax reform and in the context of Russia's structural reform program. It is in line with the proposals of the new governmental economic strategy, particularly with boosting the share of natural resources in generating revenue and reducing income tax rates. The extra advantage to rent taxation and revenue recycling is that it would allow the government to lower the tax burden without leading to a budget deficit.

This paper—a product of the Poverty Reduction and Economic Management Sector Unit, Europe and Central Asia Region—is part of a larger effort in the Bank to understand the quality of fiscal adjustment in Central and Eastern Europe. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Doreen Duff, mail stop H4-407, telephone 202-473-9506, fax 202-522-2754, email address dduff1@worldbank.org. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at bbosquet@worldbank.org. March 2002. (66 pages)

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IN THE RUSSIAN FEDERATION**

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EXECUTIVE SUMMARY

1. Russia has one of the richest natural resource endowments in the world. It is the largest producer of natural gas, the third largest producer of crude oil and one of the principal sources of many minerals, such as coal, gold, diamonds and ferrous metals, as well as biological resources such as timber and fish. Despite their importance in the Russian economy, natural resources do not contribute as much as they could to public revenues. Large resource rents (excess payments, *i.e.* above-normal profits generated by natural resources in scarce supply) are dissipated through subsidies and wastage and/or appropriated by private interests. Failure to tax this rent means either that taxes must be levied elsewhere (*i.e.*, on capital and labor) to sustain revenues thereby depressing investment and employment, or that potential revenues are foregone. Failure to reinvest rent means that Russia perpetuates the traditions of exporting low value-added raw materials and excessive capital outflows, and retards the transition to sustainable economic development.

2. A more appropriate natural resource taxation system would enhance the fiscal role of natural resources as well as create better incentives for resource conservation and environmental protection. Two conditions further reinforce the appeal of such a reform. First, the state still owns most natural resources, which theoretically facilitates changes in resource pricing and taxation. Second, the cost of adjusting the tax system is relatively low at this time since Russian tax policy is undergoing a thorough reform.

3. Technically, increasing rent taxation should be relatively straightforward since the system already exists. What mainly needs to be done is to differentiate the fees to reflect objective rent-generating conditions.

4. It should be given very serious consideration in the renewed debate on tax reform and in the context of Russia's structural reform program. Indeed, it is in line with the proposals of the new governmental economic strategy, in particular with respect to boosting the share of natural resources in revenue generation and reducing income tax rates. The extra advantage of rent taxation and revenue recycling is that they would allow the government to lower the tax burden without affecting the budget deficit.

5. Recent regional experiments may show the way forward. In the Komi Republic, forest stumpage fees have been raised to better reflect and capture the timber rent. Samara Oblast has differentiated natural resource user fees to capture part of rental incomes on mineral resources. Following in Komi's footsteps, the Northern territories have declared their intention to differentiate all natural resource payments. Finally, Yaroslavl Oblast is developing a cadaster of its resource base designed to value and price resources more adequately. A similar experiment is taking place in the Vologda region.

6. The Government is aware that natural resources are inadequately taxed and has proposed that the public finance role of rental payments should be enhanced and these payments should be differentiated according to the amount of potential rent.

7. This report provides estimates of the average and total current rent on crude oil, natural gas and round wood. For each of these resources, a large fraction of the rent is unrealized, meaning it is dissipated through economic inefficiencies (subsidies and waste). The remainder of the rent, which is realized, consists of normal profit (the entrepreneurial rent), rent captured by taxes, and excess profit (the appropriated rent).
8. Regarding crude oil, the average current rent was estimated at US\$ 95 per ton in 1999, which broke down into 42% unrealized rent (subsidies to the Russian and other Commonwealth of Independent States economies), 17% normal profit (assuming a 20% return on equity), 25% tax take, and 15% appropriated rent (assuming transfer pricing). This amounts to an annual total appropriated rent on crude oil of US\$ 4.5 billion in 1999 (US\$ 12 billion in 2000).
9. Regarding natural gas, the average current rent in 1999 was estimated at US\$ 55 per thousand cubic meters, breaking down into 66% unrealized rent (subsidies to the Russian and CIS economies), 4% normal profit (assuming a 15% return on equity), 16% tax take, and 14% excess profit. This amounts to a total appropriated rent on natural gas of US\$ 4.6 billion per year.
10. The sum of appropriated rent on oil and gas was estimated at US\$ 9 billion in 1999 (in excess of \$15 billion in 2000), *i.e.* about 18% of consolidated tax revenues.
11. Regarding round wood, the average rent in 1999 was estimated at US\$ 17-24 per cubic meter (depending on the data set used), which is made up of 41-57% unrealized rent (subsidies to the Russian economy), 7-10% normal profit (assuming a 20% return on equity), 20-23% tax take, and 11-33% excess profit. This would mean a total appropriated rent on round wood of US\$ 191-1,032 million per year.
12. Unrealized rent, inadequate withdrawal of rent and misuse of the rent that has been withdrawn (due to irresponsible public expenditure programs) all represent some form of misuse of public resources.
13. Improving natural resource taxation should follow the principle of differentiation, *i.e.* withdrawing the rent by imposing higher taxes on resource deposits that are more profitable. A seemingly desirable instrument, true differentiation of rental payments does not exist in Russia – in spite of legislative provisions that it should. Several natural resource taxes are specific taxes (set per volume), regardless of market prices or production costs. Such taxes favor profitable deposits and penalize marginal ones. Instead, they should attempt to withdraw the rent.
14. Russia being a federation, it would be crucial that any proposed tax shift from capital and labor to resource rents be acceptable to the region(s) where the natural resources are located but also to the federal government, through whose budget interregional equalization takes place.
15. A final consideration is the volatility of primary commodity prices. This hampers shifting taxes from capital and labor to natural resource rents, since rent fluctuates along with commodity prices. In a highly volatile context, a system primarily based on rent extraction

may be characterized by revenue instability. If a total substitution of rental payments for other taxes is thus unlikely, the government can still extract the rent when it is present and cut taxes on capital and labor accordingly.

I. INTRODUCTION

Overview of Current Tax Structure

1.1 Like most countries, Russia collects tax revenues from three bases – labor, capital and natural resources. Table 1 gives the shares of the main revenue categories in the 1999 consolidated and federal budgets.¹

Table 1. Russia's 1999 Budget Revenues

	Consolidated budget			Federal budget		
	Share	mn RUB	mn US\$	Share	mn RUB	mn US\$
Total revenues	100%	1,197,454	48,284	100%	611,710	24,666
Tax revenues	83.7%	1,002,606	40,428	83.3%	509,507	20,545
CPT	18.4%	220,207	8,879	13.3%	81,201	3,274
PIT	9.8%	116,940	4,715	3.3%	19,928	804
VAT	24.0%	286,894	11,568	36.1%	221,031	8,913
Excise taxes	9.1%	108,416	4,372	13.8%	84,212	3,396
Licenses	0.1%	1,620	65	0.1%	689	28
Foreign currency tax	0.2%	2,467	99	0.2%	1,450	58
Sales tax	1.6%	19,293	778	0.0%	0	0
Other taxes	0.0%	11	0	0.0%	1	0
Imputed income tax	0.6%	6,936	280	0.2%	1,259	51
Property taxes	4.4%	52,600	2,121	0.1%	749	30
"Green taxes"	3.7%	44,575	1,797	1.7%	10,496	423
Foreign trade taxes	7.2%	86,262	3,478	14.1%	86,262	3,478
Other taxes	4.7%	56,386	2,274	0.4%	2,228	90
Non-tax revenues	6.9%	82,583	3,330	7.7%	47,010	1,896
Transfers	1.3%	15,051	607	0.0%	9	0
Budget funds	8.1%	97,214	3,920	9.0%	55,183	2,225

Source: Ministry of Finance.

1.2 Taxes on income (including corporate profits and personal income), goods and services (including VAT and excises), and foreign trade (import and export duties) together make up about 70% of consolidated revenues. The concentration of the revenue capacity in a few taxes is even more marked at the federal level, where the same five taxes provide some 80% of revenues.

1.3 Table 2 breaks down the total revenues from natural resource and environmental taxes into the various constituent parts. Green taxes, *i.e.* natural resource user fees and pollution charges, make up less than 4% of consolidated revenues, and less than 2% of total federal revenues. They provide more at the sub-national (regional and local) level, namely

¹ The consolidated budget is the sum of the federal and sub-national budgets of the members of the Russian Federation (provinces, autonomous republics, *etc.*)

just over 5%. By far the most important natural resource user fees and environmental taxes are the subsoil user fees (see the definitions in Table 4). Land tax revenues generate just under 1% of consolidated revenues², while forest fees come third with less than 0.15% of consolidated revenues. The share of pollution charges accruing to the budget is even more marginal as it provides less than 0.05% of revenues. Although these revenue categories represent slightly larger shares of the regional budgets, the amounts are low in comparison with the top five revenue categories mentioned above.

Table 2. Natural Resources and the Environment in Russia's 1999 Budget

	Consolidated budget			Federal budget		
	Share	mn RUB	mn US\$	Share	mn RUB	mn US\$
Total revenues	100%	1,197,454	48,284	100%	611,710	24,666
Total "green taxes"	3.72%	44,575	1,797	1.72%	10,496	423
Subsoil user fees	2.51%	30,077	1,213	1.18%	7,190	290
Continental shelf	0.00%	25	1	0.00%	0	0
Forest fees	0.14%	1,727	70	0.07%	447	18
Water fees	0.09%	1,035	42	0.03%	198	8
Pollution charges	0.04%	461	19	0.08%	461	19
Land tax	0.91%	10,939	441	0.36%	2,189	88
Other user fees	0.03%	312	13	0.00%	10	0
Other revenues	96.28%	1,152,878	46,487	98.28%	601,214	24,242

Source: Ministry of Finance.

1.4 Of course, natural resources generate more budget revenues than suggested by the single item "green taxes" of Table 1 and Table 2. Natural resources also generate revenues indirectly via profit taxes, excises, VAT, export duties, *etc.* Table 3 reports the contributions of the main natural resource sectors to the revenues collected by the Ministry of Taxation. Out of the tax revenues collected by the Ministry of Taxation in 1999, four of the main natural resources – namely fuels, metals, wood and fish products – contributed around 20%, including over 17% from fuels and metals alone. This proportion is much larger than the 4% of total consolidated revenues due to natural resource user fees. And this is not the whole picture.

1.5 Table 3 does not contain the revenues collected by the Customs Committee (*Gostamozhkomitet*), which is responsible for levying import and export duties, as well as the excises on exported oil (about one-third of the oil produced). For example, *Gostamozhkomitet* reports collections of RUB 39 bn (around US\$ 1.5 bn) in export duties in 1999, *i.e.* over 3% of consolidated budget revenues. Indeed around 80% of export duties

² Land taxes produce relatively large revenues, although large land users (*e.g.* the firm Gazprom) pay no land taxes for most of their production and transport installations (Voronkov 2000b).

were due to natural resources, including oil products (51%), ferrous metals (13%), wood products (7%), and copper (5%) (Kaulbars 2000).³

Table 3. Estimated tax collections by the Ministry of Taxation in 1999
(based on first 9 months)

	Total		Tax revenues accruing to the federal budget							
			CPT		VAT		Excises		User fees	
	mn RUB	% Share	mn RUB	% Share	mn RUB	% Share	mn RUB	% Share	mn RUB	% Share
Total	760,757	100	70,960	100	138,513	100	69,410	100	8,725	100
Fuels	92,945	12.2	8,412	11.9	10,401	7.5	9,052	13.0	5,046	57.8
Oil	62,357	8.2	6,987	9.8	6,411	4.6	4,317	6.2	3,272	37.5
extr.										
Oil ref.	12,044	1.6	825	1.2	846	0.6	3,774	5.4	81	0.9
Gas	12,588	1.7	421	0.6	2,211	1.6	954	1.4	1,316	15.1
Coal	4,864	0.6	112	0.2	682	0.5	0	0.0	67	0.8
Metals	38,274	5.0	79,996	11.3	-4,042	-2.9	14	0.0	1,513	17.3
Wood	13,649	1.8	1,997	2.8	1,523	1.1	21	0.0	260	3.0
Fish	2,843	0.4	372	0.5	446	0.3	6	0.0	5	0.1

Source: Russian Ministry of Finance.

1.6 The total contribution of natural resource sectors to tax revenues under current policy is thus very substantial. There are, however, two issues to be raised with the current approach to taxation of these income streams. First, except in the category of natural resource user fees, which represent a small fraction of total Taxation Ministry collections, the contribution of natural resource sectors to tax revenues is indirect, to the extent that it is not the resources themselves that generate the tax revenues, but the value added to these resources. Taxes on profit, social security contributions and excises may burden the capital and labor applied to natural resources.

1.7 Second, failure to capture much of the rent potentially available puts the sustainability of these tax revenues in doubt. This latter issue will become more critical as some of Russia's reserves become scarcer.⁴ Of course some of the appropriated rent could be reinvested directly into productive uses without transiting through the budget, but this is far from guaranteed. Russia indeed suffers from massive capital outflows, which is largely associated with natural resources, for example through underrepresented export earnings (Fisher and Sahay 1999; Loungani and Mauro 2000). Flight capital probably is not reinvested in Russia in the short term.

³ Such export duties are an effective way of capturing excess profits since they vary with world market prices and world market prices are not influenced by Russian producers. Nevertheless they are not pure taxes on excess profits and distort the allocation of resources between exports and domestic sales by penalizing exports.

⁴ According to BP Amoco, at the present rate of extraction, Russia has 22 years left of oil in the ground (BP Amoco 1999). Beyond absolute scarcity, the remaining oil becomes progressively more expensive to extract.

1.8 According to the government's strategy for economic growth, the "aim of tax reform is not to collect more taxes and thereby solve the problem of the budget crisis, but . . . (1) to reduce the size of the tax burden as the state's obligations . . . decrease; (2) to make Russian tax policy fairer toward taxpayers whose economic conditions differ; (3) to raise the level of neutrality of the tax system toward the economic decisions of firms and consumers." (GOR 2000, 146) Other problems associated with the Russian tax system include non-compliance and non-cash payments, both of which have been the topic of a growing literature (see, *e.g.* Alexeev 1998; Aslund 1998; Herzog 1997; OECD 1999; Pinto *et al.* 2000; Pirttilä 1999).

1.9 These problems, and others associated with them, in particular capital flight, would be alleviated if natural resource rents were taxed appropriately, especially if the collected revenues served to finance a partial and gradual tax shift occurred from capital and labor to natural resources. Specifically, using natural resource rents as tax base facilitates tax assessment (calculating rent is easier than defining and assessing "income"), legitimizes taxation (rent is unearned income), and is less distortionary than income taxes.

Natural Resource Rent and Its Measurement

1.10 One way of ensuring that benefits for the nation continue to flow from its natural resource is to capture and reinvest resource "rents". In this report, "rent" is defined as follows:

"Rent is a surplus – the difference between the price of a good produced using a natural resource and the unit costs of turning that natural resource into the good. The unit costs include the value of the labor, capital, materials, and energy inputs used to convert the natural resource into a product. What remains after these factor inputs are netted out is the value of the natural resource itself – the land, water, . . . , fish, minerals, forests, and environmental resources such as air and water." (Hartwick and Olewiler 1998, 59)

1.11 Consider the following hypothetical example: the market price of a resource-based commodity is US\$ 100, its production cost (*i.e.* the operating cost of production plus depreciation) is US\$ 50, and a normal (competitive) profit needed to remunerate capital is US\$ 10. The residual value, or economic rent, is \$40. If the raw resource (say round wood) is not exchanged as such, the reference market price may be that of a processed commodity based upon the resource (say sawn goods or plywood).

1.12 Production cost can be either marginal or average. Using average production costs overestimates the real rent, however, since average costs are usually lower than marginal costs, given that marginal costs tend to increase as a function of quantity. Nevertheless, average cost data are more readily available, so average costs are often used in calculations of rent.

1.13 Theoretically, rent should be estimated in an intertemporal framework (Boadway and Flatters 1993) but the data necessary to carry out such an analysis, in particular reliable discount and inflation rates and marginal cost and revenue stream estimates, are not always available.

1.14 Ideally, rent is best observed and captured through competitive auctions. However, in the absence of such auctions, the government needs to rely on appraisal techniques to estimate the rent, and on taxes to capture it.

1.15 Determining normal profit can be controversial. Theoretically, normal, or competitive, profit is the opportunity cost of allocating one's resources to a specific activity as opposed to another, in other words the profit that would be recorded in the next best alternative. Assume that an agent has the choice between investing in natural resource extraction and manufacturing, having equal access to and knowledge of both industries. If the agent achieves a 10% rate of return in resource extraction, while he could achieve 15% in manufacturing, the normal profit, or opportunity cost of extracting natural resources, would be 15%. In this case, the agent foregoes profit. If, instead, the profit in resource extraction were 20%, the agent achieves more than the opportunity cost of manufacturing, which is still the next best alternative to resource extraction. The difference can now be called excess profit. In a perfectly competitive market (perfect information, no barriers to entry, *etc.*) more firms would enter the natural extraction business to compete down this excess profit to zero. In a non-competitive market, actual profits may stay above competitive profits. In the case of natural resources, which are in relative scarcity, this excess profit is called economic rent.

1.16 Practically, normal profit may be thought of as the return on a risk-free asset, plus a premium related to the investment risk involved in a given economic activity. A high-risk project would thus entail a high premium and a high normal profit. In a natural resource project, the residual profit above that would be considered economic rent. If possible, normal profit can be broken down into short-term normal profit (a competitive return on short-term assets, or working capital, needed in production) and a long-term normal profit (a competitive return on long-term assets).

1.17 Potential rent is not the same thing as realized rent. For rent to be maximized, in other words for realized rent to be equal to potential rent, there must be no rent dissipation. For instance, in the case of wood resources, illegal harvesting and environmental damage constitute resource waste and rent dissipation. Figure 1 shows how potential timber rent is used and dissipated. The same logic applies to most every natural resource.

1.18 The rent appropriated by actors along the forestry chain (all the way from the logger to the final customer) is theoretically much lower than the potential forest rent. The *potential forest* rent is the inherent residual value of the forest given a perfectly competitive market and efficient technology. Neither condition is ever completely met, resulting in part of the potential rent being *unrealized*, *i.e.* dissipated. The market is never perfectly competitive due to the existence of *market failures* (monopoly power, transaction costs, imperfect information, negative externalities, *etc.*), and technology is at least somewhat inefficient (there is always some material waste in the harvesting and processing links of the forestry chain). The *environmental damage of logging* also detracts from the value of present and future harvests. *Silvicultural rent* may arise from less-than-optimal forest management rules. Finally, *high grading* ("cutting the best and leaving the rest") causes the loss of potentially economic timber.

1.19 Of the rent that is *realized*, only a fraction is *recorded*, the rest being lost to *illegal activities*. Ultimately, the recorded rent can be divided into three components: the part that is *captured* by the government in the form of forest revenue (sometimes called forest taxes); the part that is the forest enterprises' *normal (competitive) profit* to remunerate capital; and the part that is appropriated by forest and other enterprises as *excess profit*. This residual value is called stumpage value. The government may decide to assess the stumpage value and attempt to capture it through a variety of fiscal or forest management instruments.

The Taxation of Rent

1.20 Taxing rent offers several advantages from a public finance perspective. Rent is price-determined as opposed to price-determining: rent does not enter production costs and does not determine value. Given that the price of the resource or the resource-based commodity is given by the competitive market, not driven by the tax on rent, and given that the tax still allows for cost recovery and a competitive rate of return, taxing rent is neutral with respect to economic activity. Since pure rent taxes are neutral, they are said to be non-distortionary. On the contrary, taxes on capital and labor do influence economic activity as they tend to deter people from working and firms from investing, which is why they are called distortionary. The idea of neutrality adopted here is that, beyond the reduction in disposable income itself, a tax should not alter decisions on consumption, production or trade, nor the ordering of consumption, production and trade options (Garnaut and Clunies Ross, 1979).

1.21 A pure tax on rent withdraws the excess profit and is purely price-determined. As such, it does not distort economic decisions, which also implies that it cannot give any price incentive to consumers for more rational resource use or pollution abatement. The pure tax on rent has been discussed by various authors, including Garnaut and Clunies Ross (1975). Other taxes can help withdraw the rent by taxing the use of the rent-generating factor, *e.g.* a mineral resource, fish landings, or water pollution. Such taxes withdraw the rent, not from the firm's bottom line, but through higher costs of production, which are price-determining. Consequently, these taxes can no longer be viewed as purely non-distorting. On the other hand, they do create price incentives for more rational resource use or pollution abatement.

1.22 More generally, rent capture produces its primary benefits in terms of efficiency and equity of the tax system. From a classical efficiency point of view, it facilitates tax assessment since the base for rental payments is easier to define than "income." Sources of income may not be known, and income tax legislation typically includes many loopholes and clauses giving rise to "tax engineering," so that income can be hidden or sheltered. In contrast, it is difficult to hide or shelter a natural resource, and taxing rent makes it possible to remove some of the existing distortions due to taxes on capital and labor. From an equity point of view, it enables the current and future generations to benefit from a collective good, the quantity and quality of which cannot be significantly improved by man's intervention.

1.23 Taxing away the rent may also help to prevent or moderate the "Dutch disease," which is the expansion of the natural resource sector benefiting from a windfall (*e.g.* an increase in oil prices) and the contraction of other sectors producing tradable goods. Following such a favorable shock, if income is consumed rather than saved, a resource

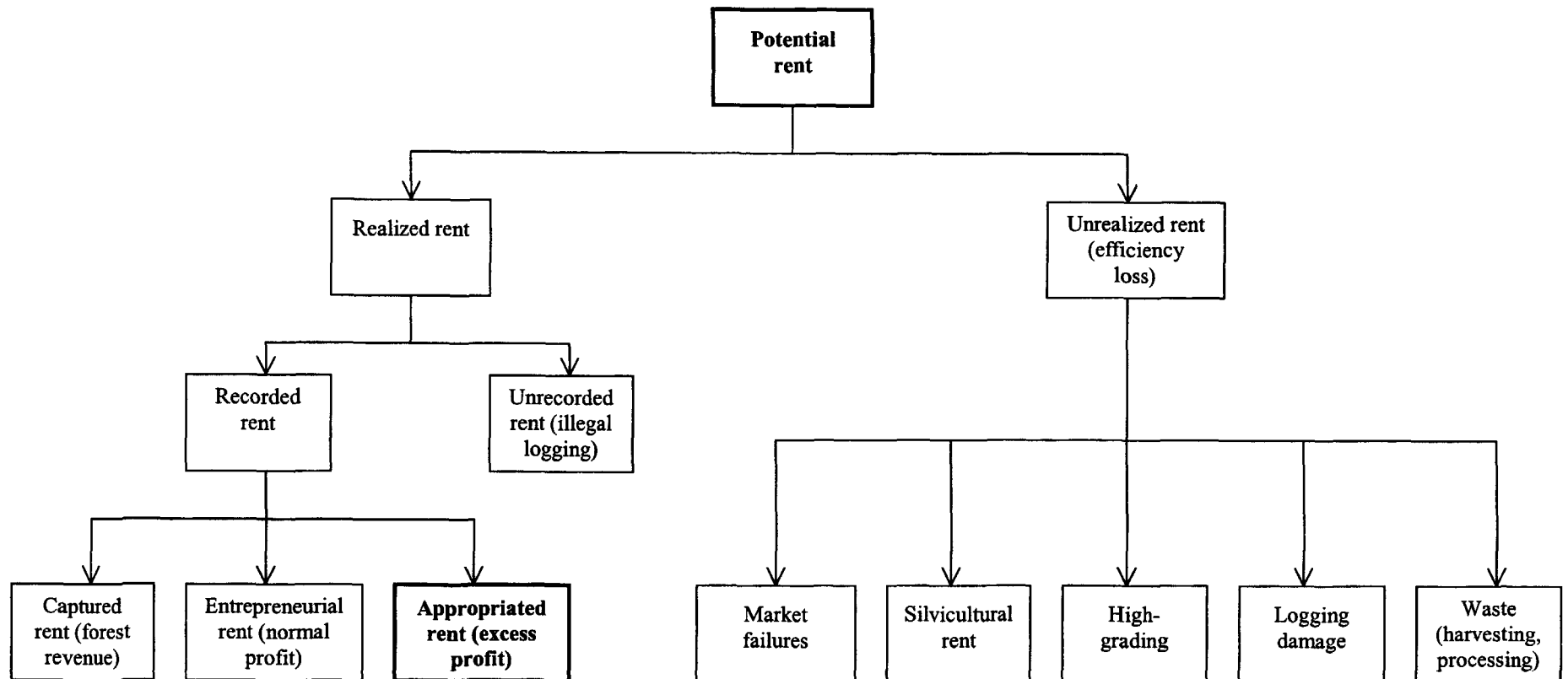
movement effect occurs: factors of production are drawn towards the booming sector away from the non-resource producing sectors. In addition, a spending effect takes place whereby higher incomes also stimulate the demand for non-tradable goods. As a result, the real exchange rate, defined as the price ratio of non-tradable to tradable goods P_n/P_t , appreciates. With a higher real exchange rate, qualitatively superior imports are substituted for domestic production. Both these effects combine to hurt the non-resource domestic tradable goods sectors (Gelb 1988).

1.24 The benefits of capturing rent extend even beyond the efficiency and equity of the tax system. With respect to exhaustible resources, withdrawing and investing rent is a condition of long-term sustainability. The “Hartwick rule” states that if investment in produced capital just equals current rents on the exhaustible resource at each point in time, then the resulting path for the economy is one where welfare equals a maximal constant value *ad infinitum* – one definition of sustainability.⁵ In other words, for each subsequent generation to enjoy the same consumption level *per capita*, all scarcity rents of exhaustible resources must be reinvested in man-made capital, technical knowledge, *etc.*, and none consumed by the current generation (Hamilton 1995, 1999; Hartwick 1977; Hartwick and Olewiler 1998; Tietenberg 1992).⁶

⁵ This definition of sustainability refers to “weak sustainability.” In this version, a given level of welfare can be maintained by substituting man-made capital for natural capital. In the “strong sustainability” version, by contrast, a threshold stock of natural capital would need to be preserved to sustain the diversity of the origins of welfare.

⁶ Apropos of renewable resources, the rule is that a resource is managed sustainably, in other words is not depleted, if it is in steady state, *i.e.* if withdrawals equal reproduction. Steady state requires that all inputs into production be set at the appropriate level: in the case of wood production, trees themselves should not be overharvested, the quantity and quality of man-made harvesting capital should be kept up, and the human population consuming wood products should be stationary (Hartwick and Olewiler 1998).

Figure 1: From potential to appropriated forest rent



Sources: Gillis 1992; Linddal 1999

II. NATURAL RESOURCE TAXATION IN RUSSIA: CURRENT SYSTEM AND RECOMMENDATIONS

Overview

2.1 Russia's current system of natural resource and environmental taxes consists of the main items listed in Table 4. Various payment types exist, including natural resource user fees, pollution charges, consumer taxes on energy, and prices paid to acquire public assets such as land. At their current level, natural resource and environmental taxes cannot provide real incentives for rational resource management nor capture economic rents (OECD 1999). Mineral resources provide a case in point.

Table 4. The Russian System of Natural Resource and Environmental Taxes⁷

Type of payment	Description
1. Subsoil user fees	
1.1 Rental payment	Annual payment for carrying out exploration activities, set per unit of subsoil area used and determined as a function of the geographical features and size of the subsoil area, the type of fossil resources, the duration of activities, the level of geological study of the subsoil area, and the perceived degree of risk. Equal to 1-2% of surveying and assessment costs.
1.2 Royalty	The rates, set as percentage of the sales value of extracted minerals, vary between 1% for low-grade ferrous metals and underground waters and 16% for high-grade oil and natural gas. For oil and gas, the range is 6-16%. The fees for gold and diamonds range from 4 to 10 and 4 to 8% of sales value, respectively. Payment is to be made by the investor in cash or in kind.
1.3 Payment for replacing the mineral base ⁸	Depletion (severance) tax, set at 10% of the sales price of minerals, designed to finance geological exploration. Also called geological fee.
1.4 Excise taxes for oil and gas	For oil: rate set at RUB 66 in 2001 per ton extracted, with no differentiation according to rent-generating factors, in contradiction to Article 46 of the Law "On the Subsoil." For natural gas: 15% of sales value for domestic market (30% for exports), accruing on a cash basis.

⁷ Some of these taxes will likely soon be subject to revision in the context of the Putin-Kasyanov administration's new economic strategy.

⁸ VSMB in Russian.

Type of payment	Description
1.5 Fees for the use of the sea bottom	
1.6 Export duties	Rates vary according to commodities.
1.7 Production sharing agreements ⁹	
1.7.1 Bonus	One-time payment, the level of which is set contractually, and which is due upon signature of the agreement or achievement of the contractual results.
1.7.2 Rental	Same as 1.1 above.
1.7.3 Royalty	Same as 1.2 above.
2. Energy product taxes	
2.1 Taxes on fuels and lubricants	Tax on oil refineries.
2.2 Excise tax on gasoline	Limited to gasoline sold on the domestic market. Rates range from RUB 80 to RUB 370 depending on octane.
3. Fees for the use of the continental shelf	Divided into mineral and living resources.
4. Forest user fees	See <i>infra</i> .
5. Surface water user fees	Paid for a number of water uses, including industrial processes, production of drinking water, use by the hydropower and transport sectors. Irrigation is exempt.
6. Pollution charges	See <i>infra</i> .
7. Land use payments	
7.1 Land taxes	Land taxes are due on private land or land used under conditions of life-long possession. Land taxes are the lowest on forested land.
7.2 Land rentals	Land rentals are due on public land, <i>i.e.</i> land owned by the state, regions or municipalities.
7.3 Normative prices	Normative prices are paid upon transfer of land from the state to private hands. Payments are the highest on urban land, reaching very high levels in city centers, but are extremely low in rural areas. By law, normative prices do not exceed 75% of market value.
8. Payments for the use of aquatic biological resources	Used to fund research, management, protection and reproduction of aquatic biological resources, in addition to fines for damage to resources and violations of normative acts. Payment made upon receipt of the fishing quota. Rates range from RUB 20/t for Far Eastern herring and Far Eastern salmon to RUB 10,000/t of high-grade crab.

⁹ The final tax status of PSA has not been decided yet. The taxes presented here are probably the minimum.

Type of payment	Description
9. Payments for the use of terrestrial biological resources	Payments for hunting wild animals consist of a permit per animal killed or day spent hunting, and a penalty for infractions. Payments are determined in relation to the minimum wage (<i>e.g.</i> , the license to kill a beaver equals 0.2-0.6 * the minimum wage, while for a bear it equals 3-6 * the minimum wage). For plants and animals listed as protected species in the Red Book, no regular licenses can be granted but fines are applicable to punish hunting or collection. These fines are set as a multiple of the minimum wage as well (<i>e.g.</i> for plants, they range from 0.2 to 300 times the minimum wage). Finally, small entrance fees are sometimes charged for the right to visit national parks.

Sources: Arthur Andersen (1998); GOR (1996); IFEI (1998); Kasyanov (2001); Mikheva and Sheingauz (1999); Roskoshnaya (2000); Sagers *et al.* (1995); Shevchuk (1999); Titova (2000).

Oil and Natural Gas

Oil and Natural Gas in the Russian Economy

2.2 The energy sector, in particular oil and gas, is central to the Russian economy. Depending on economic conditions, oil and gas earn 20-40% of consolidated budget revenues and 30-40% of foreign exchange earnings. In 1999, the oil and gas industry employed 618,000 people, including 416,000 in oil extraction, 117,000 in oil processing, and 85,000 in gas extraction. It is thought that the relative recovery of the Russian economy in 1999 and 2000 is owed to the comparative advantage of local production following the depreciation of the ruble, and to the soaring crude oil prices on world markets. Despite years of adjustment, energy is still much cheaper in Russia than abroad, which distorts resource allocation by subsidizing domestic industry (IFEI 2000). For example, domestic oil refining is in some cases value-subtracting since its actual revenues are lower than the potential exports of crude oil.

Tax Regime in the Upstream Oil Sector

2.3 Taxation has been identified as one of the main issues deterring investments in the Russian oil sector. "The Russian system of taxation is generally believed to be one of the most complicated, burdensome and unpredictable in the world" (Arthur Andersen 1998, 5). The Russian system of upstream oil taxation consists of two regimes: the regime for licensed oil and the regime for production sharing agreements. By far the largest share of oil production is under the former regime, although badly needed foreign investments are overwhelmingly in favor of the latter.

Licensed oil

2.4 In addition to all the general taxes imposed at the national and sub-national levels, oil companies pay taxes that are specific to the oil sector. These include: (1) export duties; (2) oil excises; (3) royalties; (4) bonuses; and (5) geological fees.

2.5 The *export duty* was introduced in January 1992 as a wedge between domestic and foreign prices. The rate was initially set at ECU 26 per ton of crude oil and gradually reduced to ECU 15 per ton in mid-1996, as part of the Government's commitment to bringing domestic energy prices in line with international ones. The oil export duty was completely phased out in 1997, but then reinstated in 1999 as world prices took off. Export duties accrue to the federal government. In 2000, the governmental Commission on Foreign Trade Protection adopted a new floating tariff system, whereby the export duty is tied to the market price of oil. Table 5 shows the progressive relationship between oil prices and export duties. This scale refers to crude oil exports beyond the Customs Union of Russia, Belarus, Kazakhstan, Kyrgyzstan and Tajikistan. Though the scale does not have power of law, the government broadly follows in when it sets export duties by resolution. The duty currently in force is in the highest bracket, somewhat independently of fluctuations in the oil price.

Table 5. Oil Export Duty and Oil Prices

Oil price (average price of the Urals blend for the preceding month, US\$/ton)	Export duty (EUR/ton exported)
< 12.5	0
12.5–15.0	2
15.0–17.5	5
17.5–20.0	9
20.0–22.5	14
22.5–25.0	20
25.0–27.5	27
27.5–30.0	34
30.0–32.5	41
> 32.5	48

Source: Brunswick Warburg (2000).

2.6 The *excise tax* was set up in August 1992 at a rate of 18% of oil sales value (*ad valorem*). It was then differentiated to account for variations in production costs (0% for high-cost producers, 24% for medium-cost producers, and 42% for low-cost producers). Excise rates increased as export tax rates decreased. In April 1994, it was transformed into an *ad quantum* (specific) tax indexed to the RUB/USD exchange rate. The range selected was RUB 0-85 per ton, with an average of RUB 55. Article 46 in the current law "On the Subsoil" clearly states that the system of mineral excises must reflect the economic and geographic conditions of each deposit, *i.e.* the differential rent (GOR 1992). Nevertheless, the Russian government has never worked out the corresponding excise rates, so this provision remains hollow. Instead, in January 2000, the range was eliminated and the excise

tax standardized at RUB 55 per ton, regardless of the deposit's economic and geographic conditions (IFEI 1998). In 2001, the standard rate was raised to RUB 66 per ton. Revenues accrue to the federal government, except under special agreements between the federal and regional governments (e.g., the Republic of Bashkortostan and Samara Oblast). Excise taxes, given their *ad quantum* nature, have a regressive impact: the relative tax take increases as market prices decline. On the contrary, for the tax system to be more neutral, the tax take should increase with profitability (Thomson 1998).

2.7 The *royalty* was introduced in May 1992 as payment for use of the subsoil. If properly designed, it could become a reliable rental payment. This is currently not the case, however. The royalty is an *ad valorem* tax based on wellhead prices (revenues) before excise taxes. Lower-cost fields pay a higher rate. The current range is from 6% to 16% of sales, with the average royalty at about 8%. The royalty is determined by negotiation or through bidding for new fields. It is fully deductible for tax purposes. Royalties are directly linked to the price of oil, which makes them neutral with respect to their effect on the timing and level of investment. Nevertheless, due to their exceedingly uniform rates, they penalize relatively marginal fields. Rates should thus be differentiated further.

2.8 Bonuses, first used in October 1992, are one-time payments negotiated as part of the license bid, and subject to a statutory minimum.

2.9 The *mineral replacement tax* (also, and more accurately, called geological fee) was imposed in February 1993, as a deduction to insure exploration and discovery to make up for depletion. It is an *ad valorem* tax, ranging from 0 to 10% depending on regions and firms. Revenues are earmarked to a federal extra-budgetary fund used to cover exploration by the Geology Committee.

Proposed Changes in Licensed Oil Taxation

2.10 To improve the system, the Russian government has planned for several years to allow oil producers to move from mainly revenue and excise taxes to a profit-based system on an elective basis. The latter would have three main components – a reasonable royalty, the generally applicable corporate profits tax and a special profits tax. The special profits tax is meant to capture windfall profits, *i.e.* rents. In order to avert a situation in which oil companies would return zero profits, depriving the government from crucial revenues, the tax move would be accompanied by an accounting and auditing reform, mandating that all companies electing the new profit-based regime adopt international accounting and auditing standards. At least in principle, the move has the favor of most international investors who are keen to see taxation vary as a function of profits instead of revenues and volumes.

2.11 Progress in implementing this change has been very slow, but the government is giving renewed consideration to a “tax on additional profits from fossil fuel extraction”¹⁰ (TAPFFE). A law titled “On the payment for the use of mineral resources” was drafted, while similar dispositions were included in the draft of Part II of the new Tax Code. This new

¹⁰ *Nalog na dopolnitelnyi dokhod ot dobychi uglevodorodov* in Russian.

tax is designed to replace the current oil excise tax on an elective basis. For the companies electing not to switch to that system, a new differentiated excise tax would be adopted. In addition, the drafts provide for a widening of the royalty band (Lapyunova and Reznik 2000). The TAPFFE would work in the following way: all the sales revenues accumulated since the beginning of a project would be divided by the accumulated eligible costs, to determine a so-called “R-factor” for each site. The size of the R-factor would then determine the tax rate. The tax base would be defined as accumulated revenues minus accumulated costs with some corrections. The TAPFFE takes a long-term approach to taxation as it considers all revenues and costs accrued since the first year of the project. Table 6 shows one of the latest proposals of tax rates.

Table 6. Proposed Tax on Additional Profits from Fossil Fuel Extraction

R-factor	Tax rate
< 1.0	0%
1.0-1.3	20%
1.3-2.0	40%
> 2.0	60%

Source: Ministry of Finance.

2.12 Some of the problems with the TAPFFE are that: (1) tax rates may be too aggressive (progressive) for investors to adopt the system; (2) the new tax may end up substituting for the excise tax only, while all other taxes would still apply; (3) it would probably apply to new oil licenses only, leaving a large share of the rent under existing operations untapped; (4) the notion of site is vague; and (5) as a profit-based tax, it gives no incentive for rational resource management and does not rule out profit concealment.

2.13 The new administration has reaffirmed its commitment to some sort of an excess profits tax. The recent governmental strategy plans a “tax on excess income from extraction of hydrocarbons ([in] replacement of the excise tax on petroleum for new deposits and a portion of royalties).” (GOR 2000, 150) The Finance Ministry has confirmed that royalties would be reduced in order to encourage tax compliance. So the excess profits tax would replace mostly royalties instead of excise taxes, as under the TAPFFE proposal.

2.14 Regarding the new differentiated excise tax, rates would vary between RUB 0 and RUB 80 per ton (a return to the old range), as opposed to the currently fixed rate.

2.15 Until these legal provisions become effective, the government will continue to do what it has done since the escalation in oil prices in 1999, which is to rely on export duties for withdrawing part of the rent. Export duties, made flexible to vary with world market prices, are an effective means of capturing the rent, though they discriminate against exports. To the Ministry of Finance they provide the guarantee that oil ownership translates in revenue collection.

2.16 Although taxation is partly to blame for low investments (and thus rent wastage) and low rent capture in the Russian oil sector, changes in taxation alone will not provide the

answer to low rent capture. Other issues must be addressed as well, including access to export pipeline and transfer pricing.

2.17 Vertically integrated companies (VICs) practice transfer pricing, whereby they use legal loopholes to minimize their tax liability. Under transfer pricing, the oil producer sells only part of its production directly on export markets, the bulk being sold at artificially low prices to the parent company, which is located abroad or in regional tax havens. Although the federal government has cut tax privileges in an effort to reduce transfer pricing, regional and foreign laws still exist to take advantage of tax havens.

2.18 Access to export pipelines is restricted through a non-transparent system of quotas. As a result, approximately 50 million tons of oil are forced on the domestic market every year, depressing domestic prices and wasting value. For rent to be maximized, the government should allow oil producers to export up to the level of foreign demand. Short of building new pipelines, access to existing pipelines should be made more competitive, for example using auctions, and conditioned on timely tax payments (Thomson 1998). The rent captured could then be used to cut taxes or target social needs more efficiently than through indiscriminately low domestic oil prices.

Production Sharing Agreements

2.19 Continuous changes in the tax regime have represented a major impediment to investments in the Russian oil sector. Investors are wary to spend large sums of money on long-term, high-risk projects without guarantees about the future tax regime. Production sharing agreements (PSA) are designed to provide this guarantee. Under a PSA, the private investor takes on the full risk of the investment and the state retains full ownership of the resource. When production starts, the oil (or its proceeds) is shared between the state and the investor according to contractual clauses: one part is “cost oil,” which allows investment cost recovery, and the second part is “profit oil,” for remunerating the risk and capital. The remaining oil (or its proceeds) belongs to the state. In some countries, the financial clauses of the PSA supplant all other taxes, while in others taxes still apply within the PSA framework. The important point is that all tax provisions not specifically included in the PSA are waived. To the investor, PSA offers two advantages of allowing for cost recovery before the payment of taxes, and locking in taxes for the duration of the project upon contract signature. To the state, PSA usually ensures a high volume of private investments without investment risk.

2.20 Unfortunately, under the PSA chapter, as under licensed oil, the Russian government has been slow to pass the necessary legal texts and ensure consistency. As regards taxation, Article 13 of the Law on Production Sharing Agreements provides that the investor pays a profit tax, a royalty, and payroll taxes and is exempt from all other taxes, levies, duties, including customs duties, excise taxes and other mandatory payments imposed by the Russian legislation. However, the latest drafts of Part II of the new Tax Code contradict the aforementioned Law by reintroducing several taxes in the PSA investors’ tax liability, including excises. Needless to say, this defeats the purpose of stability and predictability (Thomson 2000).

Estimation of Oil Rents

2.21 Oil production, in particular when sold on foreign markets, has recorded sharp increases in profitability since 1998, as illustrated in Table 7. As a share of sales, net profitability rose from 1% in 1998 to 37-55% in 1999. The increase continued in 2000.

2.22 How much of that is normal entrepreneurial profit, how much is rent? Large rents have been claimed to exist in the oil and gas sector. For example, estimated oil rents were estimated at over US\$ 20 billion *per annum* in the early to mid-1990s (Lvov 1994; Markandya and Averchenkova 2000). The paragraphs below renew the estimation of the current oil rent for the years 1999 and 2000.

Table 7. Financial Breakdown of Russia's Oil Exports
(US\$/ton)

	1998 ^a	1999 ^a	1999 ^b	1999 ^c
Export crude oil price	77.9	144.9	120.7	104.8
Excise tax	9.1	2.2	2.2	--
Royalty	6.0	11.6	2.2	--
Mineral base replacement	4.6	8.7	2.6	--
Road fund	1.1	2.9	0.6	--
Property tax	1.7	0.7	0.6	--
Social insurance	2.5	0.9	1.1	--
Local and other taxes	0.5	0.2	0.5	--
Transport, customs fees, port charges, handling	19.0	17.4	18.7	--
Direct production cost	15.6	12.8	6.0	--
Salaries	6.6	1.7	2.9	--
Depreciation, amortization	9.5	2.9	2.5	--
Other costs	0.6	0.4	0.0	--
Management	0.4	0.2	0.0	--
Pre-tax income	0.8	82.4	80.8	--
Net income	0.5	53.6	56.5	58.4
Net margin (%)	1.0%	37.0%	46.8%	55.4%

Sources: a) Nikoil (2000); b) IFEI (2000); c) *Institut narodnokhozyaistvennogo prognozirovaniya Rossiiskoy akademii nauk*.

2.23 Rent should theoretically be estimated in an intertemporal framework but the data necessary to carry out such an analysis, in particular reliable discount and inflation rates and marginal cost and revenue stream estimates, were not available. Oil auction data, which could help measure and collect the rent, are equally absent. The analysis is thus limited to average current rents using a net-back approach.

2.24 As per the schematic in Figure 1, potential rent consists of realized and unrealized rent. Unrealized rent is due to allocative inefficiencies. In this case, the inefficiencies can take the form of sales on the domestic market below the international price, leading to large revenue losses. The unit unrealized rent (implicit subsidy) to the national economy and those

of other Commonwealth of Independent States (CIS) economies was US\$ 40 per ton of crude oil in 1999.

2.25 Such a sizeable subsidy costs oil producers but also gives them leverage on the government, including in the area of tax reform: as long as they subsidize the national economy, how can the government expect to capture a greater share of the oil rent?

2.26 Unrealized rent also arises out of waste during extraction or production, *e.g.* if oil is left in the ground. Worse, rent is dissipated if the level of investments is insufficient to keep production levels constant. Russian oil wells have not been kept up, so their productive capacity has deteriorated and value has been wasted. This trend is hardly visible from one year to the other, as the volume extracted is relatively stable at 300-320 million tons, but over a period of 50 years, this appears more clearly, as the chart in Annex illustrates. Production peaked at 570 million tons in 1987 and declined steadily until 1996, after which it recovered slightly. Although it seems evident that waste exists, it is difficult to value it. Conservatively, this value will therefore be left at zero.

2.27 Next, Table 8 estimates the realized rent, or more exactly the recorded rent since it is assumed that there is little or no illegal extraction to speak of. Recorded rent comprises the rent captured through taxes and other levies, the entrepreneurial rent (normal profit), and the appropriated rent (excess payment).

Table 8. Average Current Appropriated Oil Rent
(licensed oil scheme)

	1999		2000	
	No transfer pricing	Transfer pricing	No transfer pricing	Transfer pricing
Revenues (US\$/ton)	69.2	69.2	110.3	110.3
Production costs (US\$/ton) ^a	19.4	19.4	26.6	26.6
Depreciation (US\$/ton)	2.5	2.5	2.4	2.4
Normal profit (US\$/ton) ^b	15.9	15.9	15.3	15.3
Tax take (US\$/ton)	27.9	16.6	48.0	28.5
Appropriated rent (US\$/ton)	3.5	14.7	18.0	37.5
Total foregone revenues (US\$ mn/yr)	1,071	4,492	5,760	12,001

a) Including operating costs and net capital investments, without taxes and depreciation.

b) 20% return on equity defined as market capitalization

Sources: IFEI (2000).

2.28 Revenues represent the weighted average of export and domestic oil sales prices. Export prices are DAF¹¹ prices. Domestic prices are the prices charged for oil delivered at the

¹¹ Delivered at frontier, *i.e.* export gate.

junction between the producer's and the main pipelines, before VAT, for consumption in Russia and other CIS countries. Production costs include the weighted cost of transportation to export gates, labor costs (including auxiliary personnel) and other production costs. Normal profit is the profit needed to ensure a competitive return on assets. Rent captured is the total tax take of the various levels of government, including the weighted shares of export duties and customs fees on exports and VAT on domestic sales, oil excises, subsoil user fees (royalties), mineral replacement fees (geological taxes), road taxes, social security contributions to extra-budgetary funds, housing taxes, profit taxes, and other taxes. Rent appropriated is the rent remaining at the enterprises' disposal after cost recovery, allowance for a normal profit and payment of all taxes. The detailed data are presented in Annex.

2.29 The average rent appropriated by oil companies is derived from market capitalization.¹² The normal profit is the return on equity expected by a new investor acquiring shares in an oil company for the long term. All Russian oil companies together were worth an average US\$ 75-80 per ton of oil extracted in 1999. The last line in Table 8 suggests that the Russian government forewent US\$ 4.5 billion in revenues in 1999 and US\$ 12 billion in 2000. This does not include part of the unrealized rent that would be realized and captured if producers were free to export as much oil as they wished. US\$ 4.5 billion represented about 9% of consolidated budget revenues in 1999. In other words, if the Russian government had captured instead of foregone that rent, taxes on capital and labor could have been cut by over 9% in 1999.

2.30 The choice of a rate of return is a controversial matter. Theoretically, the normal profit is the opportunity cost of allocating resources to the current economic activity. The opportunity cost is the profit that would be achieved in the next best alternative. The corresponding rate of return is then applied to the investment in the activity at hand. This method presupposes that opportunity costs are easily quantified. However, conditions in Russia do not allow easy quantification. Reliable information about profit margins is not available, and opportunity costs are uncertain because of multifarious risks. The ruble has experienced wide fluctuations in the past 10 years, ownership rights are not adequately protected, tax regimes have a high propensity to change, banks go bankrupt, *etc.*

2.31 Practically, the assumption here is that resources invested in oil extraction could be allocated to alternative long-term assets. For example, the return on the Russia Eurobond 2007, *i.e.* the debt issued in foreign currency by the Russian government with a 7-year maturity yielded an average 16% in 2000. The Russia Eurobond 2007 is a relevant reference asset as it gives an idea of the opportunity cost of investing money in Russia in the long term.¹³ It involves a 10% risk premium over a risk-free asset such as the 7-year U.S. Treasury bill. The question is whether investments in the Russian oil sector should receive an

¹² This method is used by the U.S. Bureau of Economic Analysis to assess natural resource rent in the United States under the name Current Rent Method I (BEA 1994, 2000).

¹³ The Russia Eurobond 2007 yielded an average 30% in 1999, which is quite high, in the aftermath of the financial meltdown of August 1998. The downward trend in yields since 1999 indicates that investors are regaining confidence in Russian Eurobonds, which also justifies using that this type of instrument as a benchmark for normal profit.

additional risk premium due to the inherent risk. This question can be debated at length. The stance taken here is that a premium on the order of 5% on equity is acceptable, which yields a normal profit rate of 20%.

Table 9. Appropriated Rent on Licensed Oil – Sensitivity Analysis

Profit rate *		1999		2000	
		No transfer pricing	Transfer pricing	No transfer pricing	Transfer pricing
25%	Normal profit (US\$/ton)	19.9	19.9	19.1	19.1
	Appropriated rent (US\$/ton)	-0.5	10.7	14.2	33.7
	Foregone revenues (US\$ mn/yr)	-143	3,278	4,537	10,778
30%	Normal profit (US\$/ton)	23.9	23.9	22.9	22.9
	Appropriated rent (US\$/ton)	-4.4	6.8	10.4	29.9
	Foregone revenues (US\$ mn/yr)	-1,357	2,064	3,314	9,555

* Normal return on equity defined as market capitalization.

2.32 Since normal rates of return are controversial, a sensitivity analysis is necessary, which conveys the change in profitability and rent in response to changes in normal profit rates. Table 9 indicates that even with a high normal profit rate (30%, *i.e.* Russia Eurobond 2007 + 15%), the total appropriated rent still amounted to US\$ 7 per ton in 1999 and \$US 30 per ton in 2000. The normal profit rate that brings the appropriated rent to zero in 2000 (assuming transfer pricing) is around 70%. Assuming a 20% normal profit rate and transfer pricing, Table 10 reconstructs the total current oil rent per ton of oil produced in Russia in 1999. The total average rent was estimated at US\$ 95.4, consisting of the following parts: the bulk is unrealized rent, as defined above, which amounted to US\$ 40.5 per ton, or 42% of the total; normal profit equaled US\$ 15.9 or 17%, which was a little less than either the tax take or captured rent (US\$ 24.2 or 25%) and a little more than the appropriated rent (US\$ 14.7 or 15%).

Table 10. Total Current Oil Rent in 1999
(US\$/ton)

Unrealized rent (implicit subsidy)	40.5
Entrepreneurial rent (normal profit)	15.9
Captured rent (notional tax take)	24.2
Appropriated rent (excess profit)	14.7
Total rent	95.4

Estimation of Gas Rents

2.33 The firm OAO Gazprom, a natural and legal monopoly, accounts for 92% of natural gas production in Russia. It is the largest natural gas producer in the world.¹⁴ Gazprom

¹⁴ Plans are discussed to break up the monopoly into Gazprom's core functions (production, transportation, distribution, *etc.*).

employs around 300,000 people and is Russia's largest company on this count. The production of natural gas, like that of oil, has diminished since the early 1990s, though much less dramatically than oil, as the chart in Annex illustrates. In 1999 it totaled 591 billion cubic meters.

2.34 As in the case of oil, a large share of the natural gas produced in Russia is consumed in the CIS. The Annex indicates that only about 31% of the total production is exported, 58% is sold on the CIS markets and 11% is consumed by enterprises for their own needs. The price difference, which arises from local regulations, represents an implicit subsidy to CIS economies. Given that the price difference between exports and CIS sales was around US\$ 36 per thousand cubic meters in 1999. As in the case of oil, the size of the total subsidy gives gas producers, especially Gazprom, some leverage on the government to call for tax concessions and other privileges. Gazprom can even threaten the government to reduce investments, which could damage energy security.

2.35 To calculate the current average recorded rent, Table 11 uses Gazprom's market capitalization as a basis for calculating normal profit. As of December 1999, Gazprom's market capitalization was US\$ 7 billion. A 15% return on equity was applied in the central scenario. The normal profit rate selected for natural gas is lower than for oil given the lower level of risk associated with gas production in Russia, mainly because Gazprom is a monopolist. The average appropriated rent was US\$ 8 per thousand cubic meters and total foregone revenues amounted to US\$ 4.6 billion, which does not include the part of the unrealized rent that would be captured if producers were able to export more.

Table 11. Average Appropriated Natural Gas Rent
(1999, US\$/thousand m³)

Revenues	24.8
Costs of sales	5.4
Depreciation	1.0
Normal profit *	2.0
Tax take	8.6
Appropriated rent	7.8
Total foregone revenues (US\$ mn)	4,598

* 15% return on shareholders' equity (valued at market capitalization).

2.36 Revenues are the weighted average of domestic and export sales. Production costs include the expenditures on energy, labor, transportation, gas purchases from independent suppliers, and marketing. The tax take is the share of the rent that is captured by way of taxes and other levies, including the weighted share of excise taxes and VAT on domestic sales, the weighted share of excise taxes and export duties on exports, social security contributions, as well as the road, housing, property and profit taxes, plus taxes on subsoil use and geological taxes. The appropriated rent is the share of the rent remaining after recovery of production costs, allowance for a normal profit and payment of all taxes and duties.

2.37 The rent's sensitivity to the normal profit rate reveals that the appropriated rent remains above US\$ 6 per thousand cubic meters, even if the normal profit rate is set at 25%

of market value. Table 12 shows the results. The tax take is assumed fixed, since what varies is the definition of normal profit, not actual profit.

Table 12. Appropriated Natural Gas Rent – Sensitivity Analysis
(1999)

Normal profit rate *		US\$/ thousand m ³
20%	Normal profit	2.7
	Tax take	8.6
	Appropriated rent	7.1
25%	Normal profit	3.4
	Tax take	8.6
	Appropriated rent	6.4

* Normal profit = % of market capitalization.

Table 13. Total Current Rent on Natural Gas in 1999
(US\$/thousand m³)

Unrealized rent (implicit subsidy)	36.4
Entrepreneurial rent (normal profit)	2.0
Captured rent (notional tax take)	8.6
Appropriated rent (excess profit)	7.8
Total rent	54.8

2.38 The largest portion of the rent was the unrealized rent, which amounted to US\$ 36.4 per thousand cubic meters, or 66% of the total; normal profit equaled US\$ 2 or 4%, the tax take or captured rent amounted to US\$ 8.6 (or 16%), and the appropriated rent to US\$ 7.8 (or 14%).

Timber

2.39 Russia has the largest forest resources of any country, comprising 764 million hectares or 22% of the world's forest cover. Russian forests also account for 21% of the world's standing timber volume (82 billion cubic meters) and provide the largest land-based carbon storage in the world (World Bank 2000a).

The Russian Forest Revenue System

2.40 Like other natural resources, timber is under-priced in Russia. Stumpage fees were first established under Czar Paul I. Over time, they were refined to reflect market prices for wood products and the rent-generating factors specific to different forest areas. With the advent of communism, however, market relations were obliterated. In the forest sector this implied a complete overhaul of the stumpage fee system. In keeping with the Marxist labor theory of value, Soviet economists in 1949 made stumpage fees a function of the labor costs

of forest regeneration, disregarding the economic and geographic rent-generating variables of forest exploitation (Barr and Braden 1988; Letyagin and Pochinkov 1998; Levin 1998; Pitovranov 2000). The correlation between stumpage fees and rent was thus severed. As the proceedings of a recent workshop gathering several dozens of forest specialists from around Russia concluded:

Current forest fee rates hardly correlate with the actual (market) value of forest resources. The method of stumpage rates calculation was developed under conditions of the directive plan economy. It is not based on the market pricing mechanisms for forest products and does not take into account the whole complex of rent formation factors. The current minimum stumpage rates are significantly underestimated and do not reflect the actual value of forest resources. (FER 2000)

2.41 Today timber user fees are set at the federal level. Article 103 of the 1997 Forest Code of the Russian Federation provides that “payments for use of the Forest Fund are collected in the form of forest taxes or a rental charge.” (GOR 1997) Forest taxes are stumpage fees, *i.e.* charges paid for the right to fell a given volume of standing timber. Rental charges only differ from stumpage fees by the duration for which the right to fell is acquired: stumpage fees are paid for a period of up to one year, while rental charges are paid for leases between one and forty years.¹⁵

2.42 Short-term sales and leases differ in at least two important respects. First, short-term cutting rights are supposed to be auctioned off, whereas longer-term leases are allocated through a technical and financial review of sealed bids, in which the price is not the deciding factor. Second, different specifications are attached to the two schemes: in the short-term permit, the forest user does not have precise obligations as regards forest management, whereas a lessee must fulfill a number of conditions related to rotation, logging, reforestation, road building, *etc.* One consequence of the absence of requirements, in particular in terms of road building, under the short-term scheme is that cuts tend to be limited to areas adjacent to roads and railroads, which become over-harvested, while outlying forest areas remain undeveloped.

2.43 The Russian forest legislation makes provisions for forest revenue sharing among the various levels of government. Article 106 of the Forest Code provides that regions with final allowable cut exceeding 1 million cubic meters apportion the receipts of minimal stumpage fees and rental charges as follows: 40% to the federal budget, and 60% to the regional budget. The receipts corresponding to the difference between minimal and actual rates is reserved for the budgets of the forest management agencies (*leskhozy*). In 1999, the average stumpage fee in Russia was RUB 14, or about US\$ 0.50, per cubic meter (Petrov 1997 and 2000a).

¹⁵ In Russian, forest taxes are called *lesnye podati* and the rental charge *arendnaya plata*.

The Forestry Sector in the Russian Economy

2.44 In 1999, the forest sector accounted for 1.5% of GDP, 4.8% of industrial output, 4.5% of export earnings, 1.5% of consolidated budget revenues¹⁶, 3.3% of foreign direct investment, 8% of industrial employment, and 2% of total employment (Goskomstat; Gostamozhkomitet; Miklashevskaya 2000; NIPIEIlesprom).

2.45 The sector has been affected by the economic downturn surrounding the transition to a market economy. Timber harvesting levels declined drastically as domestic demand for wood products fell and transportation costs rose, from over 300 million cubic meters in 1990 to 80 million cubic meters in 1997 (see Annex). The officially harvested volume nation-wide amounted to 157 million cubic meters in 1999, including thinnings and salvage. Illegal logging and exports are widespread (BROC *et al.* 2000; OECD 1999; World Bank 2000a).

2.46 Output from the downstream industry also plummeted, especially in the pulp-and-paper branch. However, production volumes recovered in 1998 and 1999, in the wake of the August 1998 real depreciation of the ruble, which boosted exports and import substitution. The recovery is continuing in 2000, with a 17% increase in output in the first 6 months of the year compared to the first 6 months of 1999 (World Bank 2000b). Table 14 gives the dynamics in reported profitability of the Russian forest sector. The logging branch is reported to have been in dire financial straits until 1998, while wood processing, in particular plywood manufacturing, has fared relatively well. 1998 and especially 1999 have seen sharp gains in profitability across the board.

Table 14. Profitability of the Russian Forest Industry
(in percentage)

Branch	1990	1992	1993	1994	1995	1996	1997	1998	1999 *
Overall	17.4	36.0	24.0	10.1	15.5	-7.4	-7.7	-4.2	25.5
Logging	11.2	35.0	15.0	5.4	-6.2	-14.1	-20.9	-11.1	9.4
Sawn goods	24.1	39.6	23.0	6.7	2.2	-12.9	-14.6	1.8	11.2
Plywood	16.2	46.3	45.1	18.7	17.2	4.7	8.7	28.4	50.6
Furniture	32.0	30.0	33.2	23.0	10.5	1.2	4.1	7.1	17.6
Pulp and paper	14.9	32.0	27.0	22.6	35.2	-5.9	-2.3	12.9	37.9

9 months.

Source: Burdin *et al.* (2000)

2.47 The fact that logging was reported unprofitable for four continuous years between 1995 and 1998 is hard to believe, even allowing for accumulation of debt arrears. One must remember that revenue concealment in one form or another is rampant in the Russian

¹⁶ Including an estimated 6.7% of export duties, 2.8% of CPT, 1.1% of VAT, and 3% of natural resource user fees.

economy and the forest sector is no exception. In addition, the system of non-payments allows firms and the government to trade in non-cash instruments, which do not show up in official statistics. Given the downward bias of official statistics on profitability, the return to profitability in 1999 gives even more reason to believe that the sector is indeed recovering.

2.48 The fiscal contribution of the forest sector is not commensurate with the size of the forest resource (World Bank 1994). The potential tax revenues from the forestry sector were estimated at US\$ 0.9-5.5 billion per year in 1996 depending on assumptions about wood production and the profitability of forest enterprises, *i.e.* 0.7-4.4% of consolidated revenues (World Bank 1996). In 1999, the forest sector still contributed only about US\$ 0.55 billion, or 1.1% of consolidated revenues (including profit taxes, VAT, excises and stumpage fees).

Low Rent Capture

2.49 The mediocre fiscal role of the forest sector is due to a complex set of interrelated issues, including low stumpage fees, illegal logging and exports, and poor collection rate of stumpage fees. The first two reasons are considered here. The third reason is common to most every natural resource and every tax in Russia and is discussed in more detailed later in the context of the non-payments problem.

Low Stumpage Fees

2.50 Russian stumpage prices are less than 2–3% of the market price for timber, compared to 65% in Finland (Sokolova 2000). Russian stumpage fees are low for several reasons. As was explained above, federally mandated minimal stumpage fees do not reflect rent or market conditions. Other reasons include: (1) the cap imposed on actual stumpage fees; (2) high road building and transportation costs; (3) low value added; (4) political risks; and (5) distorted domestic and export timber market structures. When analyzing reasons 2 through 5, it helps to place Russia in international context. Finland is a meaningful reference for Russia, as the forests are comparable, and Finland is the largest importer of timber from Russia, either for processing or re-exporting. Most of the Russian-Finnish wood trade is in round wood coming from European Russia, in particular the Russian North and Northwest. Whereas in Northwest Russia the actual average stumpage fee per cubic meter of round wood was RUB 14.5 in 1999, or about US\$ 0.50 at the current exchange rate, in Finland the average rate hovered around US\$ 18, *i.e.* about 30 times more (Petrov 2000b; Finnish Forest Research Institute 2000).

2.51 First, the Russian legislation limits the autonomy of regions to raise federally mandated minimal stumpage fees: regions are only allowed to double the minimum rates.

2.52 Second, Finnish importers invoke the high costs of road building. Russian all-purpose roads are few and of substandard quality, and the quality of forest roads is even worse. Harvesters thus spend considerable resources building roads or otherwise overcoming transportation difficulties. The higher the cost, the lower the residual stumpage value. Although this argument holds some truth, it should be qualified in the following way. Firstly, much timber is cut in the winter in Russia, at a time when roads are of less importance since

the ground is frozen. Secondly, labor and fuel costs are much lower in Russia than in Finland, which compensates to a certain degree for high transportation costs.

2.53 Third, the realized rent is much lower than the potential rent due to low value added. One problem is the overall inefficiency of forest enterprises, starting with high wastes of raw material. Waste rates ranging between 25% and 75% of all timber cut have been reported for the Soviet period (Levin 1992; Nilsson *et al.* 1992; World Bank 1997). Losses of 40-60% are reported for the present time in the Russian Far East (BROC *et al.* 2000). Wasted timber represents unrealized rent, so less efficient operations will be ready to pay only lower residual stumpage values. In addition, Russian wood may not quite be of the same quality as Finnish round wood. Wrong assortment size and late delivery damage the quality of timber, while the sorting, drying and grading of lumber often leave much to be desired. The lower the quality of timber and lumber, the lower the stumpage value. Arguably, the continental climate causes the diameter of trees of identical species to be lower in Russia than in Finland (Myllynen 2000; Voronkov 2000). The lower is the diameter, the higher is the cost to supply a given volume, and the lower the residual stumpage value. Finally, the Russian forest sector stands out by the prevalence of logging. This underdevelopment depresses stumpage values (NIPIEILesprom). Russia predominantly produces round wood, which contains much less value added than, say, plywood or fiberboard. Wood products with less value added naturally fetch lower sales prices and generate less rent than higher-value added products. In other words, stumpage fees in Russia will be lower in Russia than in countries with more developed wood transformation sectors (Gray 1983; Lebedev 1998).

2.54 Fourth, political risks are widespread in Russia's unstable economy. Arbitrary changes in tax regime, expropriation, racket, bureaucratic hassles, and corruption all contribute to increasing the transaction costs of doing business in Russia. The higher the transaction costs, the lower the stumpage value.

2.55 Fifth, several market structure features prevent competition for timber resources and can be identified as impeding a raise in stumpage fees. Firstly, *leskhozy*, the public agencies in charge of forest management, benefit from legal privileges, which give them market advantages and reduce competition. By law, *leskhozy* are exempted from stumpage fees and most other taxes, except taxes on payrolls, personal income (levied at a rate of 12% only) and road use (Sokolova 2000). In addition, they do not have to compete in auctions to buy harvesting rights, yet they exercise commercial activities under the guise of forest management. These privileges significantly reduce market competition. The lower the competition for timber, the lower the stumpage price.

2.56 Secondly, timber auctions themselves are deficient. Although auctions have existed in Russia since the mid-1990s, they are generally thought to be of poor quality, due to a combination of factors including inadequate publicity, insufficient number of bidders, collusion among bidders, price fixing by auction organizers, and other market-biasing practices (Efremov *et al.* 1999; HIID *et al.* 1998; Jacobsen 1999; Lehmbruch 1999).¹⁷ Again,

¹⁷ Here is a revealing account of how forest auctions are held in Russia: "According to Russian legislation, both auctions and tenders require more than one bidder. But if the authorities would strictly follow this requirement, no forest resources would be utilized, since there are so few potential bidders in Murmansk . . . The typical

the lower the competition, the lower the stumpage fees and the lower the extraction of rent. Furthermore, auctions make up only a small share of the total sales of standing timber (15%), the rest consisting of direct sales. Although these sales are called *konkurs*, implying competition, the competitive element may not be present at all.

2.57 Thirdly, market power may be present. The export and domestic market relations are examined in turn. Since European Russia exports so much to Finland, one can wonder whether Finnish importers dictate their prices to Russia. It is no secret that every year, sometimes more than once a year, Russian exporters and Finnish importers gather to negotiate the import prices of timber for the following period. Prices are set per cubic meter of round wood (mostly birch pulpwood) delivered at the first railway station past the Finnish border. The current price is EUR 30.60. To determine whether Finnish importers dictate their price to Russia, one must compare the import price to the price for domestic birch pulpwood in Finland. According to Finnish academic and business experts, Russian birch pulpwood is slightly more expensive than the Finnish equivalent at the border gate. In total, however, it comes out a little cheaper as transportation distances for Russian wood from the border to the mills are generally shorter than for Finnish wood, and overhead costs are higher on Finnish than Russian purchases, essentially due to the high number of Finnish suppliers.¹⁸ Finnish companies thus find it profitable to import Russian birch pulpwood to supply their pulp-and-paper plants, but not in virtue of the particularly low price of raw materials. Instead, they need to import Russian birch pulpwood as the capacity of the Finnish supply is inadequate to meet the demand.¹⁹ Nonetheless, by doing so they also depress the demand and price for Finnish birch pulpwood, which is used here as reference for Russia (Jaaskelainen 2000; Niskainen 2000; Rytönen 2000). Hence one can conclude that the import prices of Russian wood to Finland seem to broadly follow the domestic Finnish market price, even if some depressing feedback effect on domestic market prices is inevitable. This finding is in line with earlier literature (University of Joensuu 1996). The low level of Russian stumpage fees is not the consequence of artificially low import prices imposed by Finland.²⁰

procedure seems to be the following: a single bidder proposes his bid, which is (close to) the reservation price. The *leskhoz* selects an appropriate area for leasing and utilization and the formal documents are prepared. Only then is the auction or tender announced in the newspapers. If more bidders should suddenly appear – fine – this would increase the price. If not, the first single bid proposed would be realized. . . . The common denominator [of forest auctions in Murmansk in 1999] is that there was only one bidder. . . . Since there is often only one potential buyer who is located close to the timber resources offered, the FFS [Federal Forest Service] faces a problem in defining a reservation price, which does not under-value the timber resources. The stumpage price may easily become the final reservation price. The potential buyer has no intention of giving a higher bid, knowing that there is no real competition going on.” (Jacobsen 1999, 13-14)

¹⁸ 60% of Finnish forests are owned by 400,000 small holders, which increases the number of business partners. In Russia, by contrast, the number of exporters is relatively limited.

¹⁹ The supply of birch pulpwood from Finnish producers is estimated at 4 million m³, while the Finnish industry needs 9 million m³ annually (Jaaskelainen 2000).

²⁰ Incidentally, research has revealed no signs of oligopsony power in the Finnish wood market either (Rönkä and Toppinen 2000).

2.58 One must therefore turn one's attention to the structure of the Russian timber market itself. Although analysis is limited by the availability of data, Russian loggers might be subject to some local monopsony or oligopsony power, *i.e.* the power that one or a few buyers can exercise on a larger number of sellers (Nilsson 2000). Such power may result from the naturally small number of buyers at the local level, but in a criminalized context it may also signify that local buyers use duress to procure raw materials at less-than-competitive prices. Buyers may be wood processing firms, trading intermediaries or transporters who engage in rent seeking. Some are downstream enterprises, *i.e.* down the forestry chain from loggers, others outside of the forestry chain altogether (*e.g.* pure trading intermediaries). The growth of intermediaries in the Russian forest sector has been attested before (see, *e.g.*, Sokolova 2000). Transporters, too, may appropriate rent. Given the long distances involved, transportation costs are known to influence enterprises' profitability in Russia. Most of the timber is transported by railroad. Because of high railroad tariffs, Siberian timber in CIS countries or European Russia became unprofitable when implicit transportation subsidies were cut. Indeed in the early 1990s, railroad tariffs were a multiple of timber sales prices (Blam *et al.* 2000; Sokolova 2000). Railroad tariffs have been cut and restructured on several occasions in the past few years but they are still thought to be excessive nowadays (Carlsson *et al.* 2000). The Russian railroads discriminate heavily between domestic deliveries and exports, imposing a *de facto* additional export duty on international sales. For example, in the second quarter of 1999, tariffs for export sales were 3-4 times higher than for domestic sales of most commodities including wood products (GOR 1999). This means that the railroads either appropriate rent on the export of timber or cross-subsidize domestic sales, or do a mix of the two.

2.59 Local market power increases with the trends towards integration in the Russian forestry sector. Through vertical integration, upstream and downstream companies merge to control the whole production chain from timber logging to advanced wood processing (Lehmbruch 1999; Popovskaya and Rozanova 1998). The integration under way in the forest sector has been coined "backward integration;" wood processing companies directly finance harvesting enterprises (Carlsson *et al.* 2000). Vertical integration may reduce transaction costs and boost the efficiency and profitability of forestry operations, which is why experts have advocated it for the Russian forest sector (Carlsson *et al.* 2000; Efremov *et al.* 1999). Increased allocative efficiency also results from rent maximization, provided that rental payments are high enough. Unfortunately, large vertically integrated companies exercise greater influence on the remaining independent loggers, each of them confined within its link of the forestry chain and with no direct access to the international market.

Illegal Logging and Exports

2.60 When timber is logged or exported illegally, the government foregoes stumpage fees, export duties, and other revenues. Illegal cuts and exports tend to be linked, since the customs service is supposed to verify the origin of registered timber exports. When timber is cut illegally, exporting it legally becomes more difficult.

2.61 The unrecorded rent resulting from such illegal activities could assume large proportions. For example, expert estimates put the illegal cuts in the Russian Far East at 30%

of the total actual cuts and illegal timber cuts in Russia at 12% (WWF 2000). Poachers would cut around 21 million cubic meters per year, or 15-20% of total reported cuts, with half of that originating from the Russian Far East (Medetsky 2000).

2.62 A significant part of illegal cuts take the form of sanitary cuts by *leskhoz*. Here is an unequivocal testimony by a *leskhoz* director in the Vladivostok region:

It is no secret that we ourselves, local forest services in administrative districts of the Russian Far East, are some of the most serious violators of forestry rules and regulations. Even though logging may be our only means to survive, as we receive almost no financing from the local administration and from the government, we have no right, I suppose, to log commercially under the label "salvage logging." (Viktor Kozachko, Director of the Melnichny Leskhoz, Krasnoarmeiskii District, Primorsky Krai, cited by BROOC *et al.* 2000, 21)

2.63 Concerning exports, a variety of frauds are possible, including outright avoidance of customs verification, bribing of officials, forged export licenses, misrepresentation of quality or quantity, *etc.* Several estimates of the magnitude of the problem have been published. At the high end of the spectrum, one source reports that the actual export value of timber is double the official one (RCN 1999). An audit carried out in 1995 at the customs post of Vyborg (Leningrad region) revealed that the weight of export cargoes by truck was underreported by 20-25% (University of Joensuu 1996). Based upon a comparison of the Novgorod region customs data with import data from Finnish firms, it is estimated that illegal round wood exports from Novgorod to Finland did not exceed 10-15% in 1999.

Estimation of Timber Rents

2.64 In order to estimate the current average timber rent, at least three methods can be used. First, the simple net-back method nets out reported timber production costs from timber market prices. Second, the normative net-back method consists of netting out normative (engineering) timber production costs from timber market prices. Third, auction prices can be used to derive the rent. In this method, the difference between actual auction prices and minimal stumpage fees reveals the loggers' willingness to pay for the timber, in other words the stumpage appraisal value.²¹

2.65 Though some Russian forestry specialists claim they know how to estimate the timber rent (see, *e.g.*, Moiseev 1999), practically the task presents challenges. Markets are generally non-competitive and reliable accounting information is not available. The literature is indeed very poor in attempts to measure the timber rent in Russia. Among the few exceptions, sources have reported rents in the region of US\$ 6-25 per cubic meter in Khabarovsk (Pankratova 1999; Sheingauz 1997). Recent research on one experimental *leskhoz* in the Moscow region using the normative net-back approach estimated that 23 out of the 28 forest enterprises operating on the territory of that *leskhoz* register a positive rent ranging from

²¹ Auctions will reveal the rent in the absence of road building costs, in accordance with the Russian legislation, which provides that auctions are held for short-term cutting permits not subject to road building obligations.

RUB 8 to RUB 66 per cubic meter, with an average of RUB 33 (US\$ 1.20), *i.e.* almost twice the average minimum stumpage fee in that region (Pochinkov 2000). Separate data from Irkutsk Oblast (southern Siberia) indicate that export-grade timber fetches RUB 1,000 per cubic meter but costs only RUB 350 to produce. The profit on such timber would equal RUB 650 or 65% of sales price (Shulyakovskaya 2000).

2.66 In this study, the simple net-back methodology was applied to 8 Russian regions (Arkhangelsk, Khabarovsk, Krasnoyarsk, Leningrad, Moscow, Novgorod, Pskov and Vologda) and the Russian Federation as a whole using two data sets.

2.67 The first data set was compiled from original data collected from the 8 regions. For each region, average costs and prices were obtained, covering from a couple of logging firms to all of them. The second data set was taken from NIPIEILesprom's database, which comprises cost information on 20,000 forest enterprises in the whole of Russia for the year 1998. Costs for 1998 were multiplied by the 1999 producer price index in the forestry sector (Goskomstat reports 1.572) to obtain 1999 costs.

2.68 There exist wide discrepancies between the two data sets. In particular, the costs reported directly by the regions come out much higher than the NIPIEILesprom equivalent. The higher costs from the regions are thus taken as the higher bound estimate and the NIPIEILesprom figures as the lower bound estimate.

2.69 Using the two data sets, notional profits, normal profits, notional tax takes, unit appropriated rent, and foregone revenues were calculated using two different techniques – the equity and the costs techniques. Though the data sets are independent, data from both must be combined to calculate some of the coefficients or variables in each technique, which means that the calculations themselves are not totally independent. For example, transport tariffs and handling costs are only available in the regional data set, while the normal profit rate is calculated with NIPIEILesprom data.

Equity Technique

2.70 This technique calculates normal profit as a return on equity.²² In the regional data set, production costs = production costs at lower landing minus stumpage fees. In the NIPIEILesprom set, production costs are taken as such. Then, in the regional data set, the cost of sales = production costs at lower landing + transport tariffs + handling costs; and, in the NIPIEILesprom set, the cost of sales = production costs + transport tariffs + handling costs. Next a notional gross profit can be estimated based upon the available revenues and costs. Notional profit is a reconstructed, not actual profit: notional gross profit = revenues minus cost of sales.²³ Using the regional data set, the notional tax take, which is the tax

²² This method corresponds to the "Current Rent Method I" of the U.S. Bureau of Economic Analysis (BEA 1994 and 2000).

²³ Data include FOB (free on board) and CIF (cost insurance freight) prices for round wood. CIF prices are used here as the measure of revenues.

liability that would be due if all taxes were properly assessed and collected = notional gross profit * 30% (if notional gross profit > 0) + stumpage fees + export duties. Using the NIPIEILesprom set, notional tax take = notional gross profit * 30% (if notional gross profit > 0) + export duties (stumpage fees are included in production costs and cannot be dissociated). All other taxes, in particular social security contributions, are included in production costs in both data sets. Unlike the oil and gas sectors, forest companies are not traded publicly and no market capitalization data exists to estimate equity. For the purpose of estimating normal profit, a standard return on equity therefore had to be reconstructed for the whole Russian logging sector in the following manner. Total assets in the Russian logging sector had a book value of RUB 28.6 billion in 1998.²⁴ 1999 investments amounted to just over RUB 2 billion while depreciation amounted to just over RUB 1 billion. Converting each figure in US\$ at the appropriated exchange rate and using the average equity-to-assets ratio in the logging sector of 70%, total equity in the logging sector in 1999 was around US\$ 987 million. A normal profit rate of 20% (Eurobond 2007 average 2000 yield plus a premium of around 5%) was selected for the Russian forest sector.²⁵ Given this rate and the timber cut for main usage of 122 million cubic meters, the standard normal profit on equity for the Russian logging sector for 1999 was estimated at US\$ 1.62/m³ (Burdin *et al.* 2000; Sakhanov 2000). Then, the unit appropriated rent = notional gross profit minus notional tax take minus normal profit. Since the unit appropriated rent is estimated for both domestic sales and exports, it is necessary to weight each figure by the relative sales shares: weighted unit appropriated rent = unit appropriated rent on domestic sales * domestic sales share + unit appropriated rent on exports * export share. The total appropriated rent, or foregone revenues = weighted unit appropriated rent * total timber cut for main usage.²⁶

2.71 The Annex gives the synthesis for each region and both data sets, while Table 15 gives the aggregated results for Russia as a whole. Using the regional data set as lower bound estimate and the NIPIEILesprom as upper bound estimate, the interval for the average current appropriated rent on round wood was around US\$ 1.9 – 7.8 per cubic meter in 1999, which means total foregone revenues of around US\$ 227 – 944 million per year. In addition, more revenues are foregone because part of the rent is unrealized through excessive domestic sales, which could be reallocated to export markets. However, as in the case of oil and gas, no value is attached to this category of foregone revenues, as it is not clear how much extra timber from Russia foreign countries could import.

²⁴ Book values tend to over-represent reality given some of the peculiarities of the Russian accounting system. As a consequence, the calculated normal profit might itself be overestimated, and the appropriated rent underestimated.

²⁵ NIPIEILesprom recommends 25% as a normal rate of return on capital in the logging sector, but that seemed too high as the rate for the central scenario.

²⁶ Main usage means timber cut for use as round wood, lumber, or to be processed. It excludes the sanitary and salvage cuts performed by *leskhozy*.

Table 15. Average Current Timber Rent – Equity Technique
(US\$/m³)

Dataset	Regions		NIPIEILesprom	
	Domestic	Export	Domestic	Export
Revenues (CIF price)	21.01	52.56	21.01	52.56
Cost of sales	17.00	34.22	10.21	27.42
Normal profit *	1.62	1.62	1.62	1.62
Profit tax take (notional)	2.34	8.90	3.24	9.82
Appropriated rent	0.04	7.83	5.94	13.70
Unrealized rent	12.00	0.00	12.00	0.00
Weighted average appropriated rent	1.86		7.76	
Total rent appropriated (US\$ mn)	227		944	

* 20% return on equity

2.72 Table 16 identifies the various components of rent averaged across domestic sales and exports, based upon Table 15. It is worth noting that the forest sector generates a large total rent. The government captures about US\$ 4 (or 20%) of the total rent, while less than US\$ 2 (or 10%) is earned by forest enterprises and intermediaries as normal and excess profit. The largest portion of the rent (US\$ 9.69 or 57%) is dissipated through the local economy as unrealized rent.

Table 16. Total Timber Rent in Russia – Equity Technique
(US\$/m³)

	Regions	NIPIEILesprom
Unrealized rent (implicit subsidy)	9.69	9.69
Entrepreneurial rent (normal profit)	1.62	1.62
Captured rent (notional tax take)	3.85	4.76
Appropriated rent (excess profit)	1.86	7.76
Total rent	17.03	23.82

2.73 Based upon the main usage cut of 121.6 million cubic meters in 1999, the total implicit subsidy to the domestic economy amounted to US\$ 900 million. However, total implicit subsidy does not equal foregone revenues. If all the wood sold domestically were in fact exported, some additional revenues would be generated. \$9.69 per cubic meter would be the total additional before-tax income to the exporter, of which 30% could be taxed away under the profit tax and 5% withdrawn by the export duty. 35% of the unrealized rent would thus turn into public revenues, *i.e.* \$3.40 per cubic meter.

2.74 However, the real effective subsidy to the national economy may still be underestimated. First, the salvage logging and thinnings undertaken by *leskhozy* do not generate any revenues and are an additional implicit subsidy. In 1999, for example, these cuts amounted to 22.9 million cubic meters, or 19% of the main usage. Second, part of the logging waste should be included as unrealized rent as well. Conservatively, neither salvage logging, thinning nor logging waste are captured in the tables.

Costs Technique

2.75 The costs method estimates normal profit as a percentage of production costs. Although profit is usually not measured as a proportion of costs, this benchmark has in fact been used in the forest sector in the Komi Republic, which is why the method is replicated here. All variables are calculated as in the equity method, except normal profit. Here, normal profit = production costs * a coefficient of 15%. 15% is the rate that was used in Komi in 1999.

2.76 Table 18 gives the aggregated results for Russia as a whole (see the Annex for the details per region). Again using the regional data set as lower bound estimate and the NPIEILesprom as upper bound estimate, the interval for appropriated rent on round wood was in the range of US\$ 1.6 – 8.5 per cubic meter in 1999, and total annual foregone revenues amounted to US\$ 191 – 1,032 million, to which, as above, 35% of the unrealized rent should be added to obtain the likely total foregone revenues.

Table 17. Timber Rent in Russia – Costs Technique
(US\$/m³)

Dataset	Regions		NPIEILesprom	
	Domestic	Export	Domestic	Export
Revenues (CIF price)	21.01	52.56	21.01	52.56
Cost of sales	17.00	34.22	10.21	27.42
Normal profit *	1.92	1.92	0.90	0.90
Profit tax take (notional)	2.34	8.90	3.24	9.82
Appropriated rent	-0.25	7.53	6.66	14.43
Unrealized rent	12.00	0.00	12.00	0.00
Weighted average appropriated rent	1.57		8.49	
Total rent appropriated (US\$ mn)	191		1,032	

- 15% return on costs

2.77 Table 18 distinguishes between the various components of rent averaged across domestic sales and exports. The only difference compared to Table 16 is the distribution between normal and excess profit.

Table 18. Total Timber Rent in Russia – Costs Technique
(US\$/m³)

	Regions	NPIEILesprom
Unrealized rent (implicit subsidy)	9.69	9.69
Entrepreneurial rent (normal profit)	1.92	0.90
Captured rent (notional tax take)	3.85	4.76
Appropriated rent (excess profit)	1.57	8.49
Total rent	17.03	23.82

2.78 Several conclusions and caveats are in order before closing this section. First, the picture emerging is that a significant timber rent exists in Russia, though it varies considerably across regions. Second, the variance in the data indicates that more refined methods of rent estimation must be deployed in order to arrive at a more reliable picture of the reality. Third, the local economy dissipates a large share of the rent. Fourth, the total rent on round wood was derived from the price of round wood. This method underestimates the rent since part of the round wood is in fact transformed into processed products, which fetch higher market prices and profit margin, and thus also generate higher rents. Fifth, the total forest rent is more than the rent on timber or processed wood, as it also includes the rent of land bare of forests.

Enhancing Timber Rent Capture

2.79 Forest rent can be captured by a variety of instruments. In the particular case of Russia, profit taxation is problematic, due to lax accounting and auditing rules. Another option is to rely on export duties for capturing the rent on profitable export transactions. The problem is that export duties distort resource allocation between export and domestic sales at the expense of exports. Moreover, unless substantial rents are known to exist across the board, export duties penalize marginal operations, since export duties are usually *ad quantum* instruments. An improved system of stumpage fees should therefore be privileged as a rent capture instrument. Enhancing timber rent capture requires more than an improvement in stumpage fee system, however. It calls for the following more fundamental reforms: (1) a more accurate definition of forestry costs; (2) improved knowledge of forest resources; (3) better use of forest resources; (4) increased competition in the timber sector; (5) higher investments in branches with higher value added; and (6) forest management certification.

2.80 A better definition of costs could improve forest revenues and public revenues in general. At the moment, accounting rules allow firms to include in their production costs items that have little to do with forestry, which artificially depresses reported profits and residual stumpage values, and thus also stumpage fees. Normative production costs can be reconstructed without too much difficulty for each type of technology and location, and help forest authorities decide which costs and profit margins are acceptable.

2.81 Second, the knowledge of forest resources can be improved, for example through a forest cadaster (quantitative and qualitative register) and improved inventories, in accordance with the 1997 Forest Code (Lebedev 1998). This would help the authorities better estimate the value of the resources they sell, at least until such a time when forest auctions become reliable price-setting instruments.

2.82 Third, the use of forest resources can improve through better allocation of forest parcels, based upon more rational forest planning. This, too, will raise stumpage values.

2.83 Fourth, more effective competition in the timber sector would raise stumpage fees. Possible measures, based on the above discussion, include: (1) more transparent timber auctions; (2) regulation of monopolies and monopsonies; (3) limiting *leskhozy* to forest

management; and (4) regulation of relations among buyers and sellers to guarantee sellers proper market access.

2.84 Fifth, stumpage fees will not rise to their full potential unless the economy upgrades to products with higher added value, *e.g.* plywood and pulp and paper instead of round wood. The resources needed for such investments should not necessarily come from the state, however. The decades of central planning have shown that the state often is a wasteful entrepreneur. Instead, the federal and regional governments should ensure that the conditions are favorable for private enterprises to invest. Ensuring an “enabling environment” has to do with general economic policy, which extends well beyond this paper. But without such an environment, it is unlikely that the forest sector will develop. Road building represents one small, forest-related, aspect of that enabling environment where the state may have a role to play.

2.85 Sixth, certification of the ecological, economic and social aspects of forest management by internationally recognized auditors and following internationally established standards²⁷ can help add value to timber production in the form of price rises and/or gains in market shares, and alleviate illegal or harmful practices. Certification can play an important role in the Russian regions with access to export markets, in particular the Northwest, the Far East and even southern Siberia, the latter being about to benefit from sharp increases in China’s demand for wood over the coming decades (Ptichnikov 1999; Simula 1999, 2000).

III. RECENT NATURAL RESOURCES TAX REFORM INITIATIVES

3.1 A few recent developments in Russian regions and new economic initiatives at the federal level may be signaling renewed interest for enhancing the fiscal role of natural resources.

3.2 At the federal level, declarations have been made in favor of enhancing the role of rental payments. The Putin administration adopted an economic strategy that intends to lower the fiscal burden on capital and labor and “to increase the fiscal importance of taxes related to use of natural resources and also of property taxes, which should become the basic source of revenue for regional and local budgets.” (GOR 2000, 149) The policy of lowering the tax burden on capital and labor is already being implemented. As of January 2001, the income tax was transformed from a progressive structure with top marginal rates exceeding 45% to a flat rate of 13%, while employers’ social security contributions were cut from 38.5% to 35.6%.

3.3 In the natural resource taxation area, the new Tax Code draft (Part II) and a draft Law “On Paying for Mineral Use” provide for reforming the current system of licensed oil

²⁷ Existing certification systems include, *inter alia*, the ISO (International Standards Organization) 14001, the FSC (Forest Stewardship Council), and the PEFC (Pan-European Forest Certification).

taxation. The new system would reduce the number of taxes to three – a reasonable royalty, the general corporate profits tax and a special (excess) profits tax.

3.4 At the regional level, Komi and Samara have started differentiating some natural resource user fees in order to reflect and capture a greater share of the rent. The northern territories, for their part, have passed a resolution to do the same.

3.5 Russia is a very large and diverse country. Legislative changes involving as many as 89 different regions usually involve long debates. In addition, natural resource sectors wield considerable political influence. It is therefore hardly surprising that reforms of the resource taxation system are slow to take place at the federal level. In contrast, some regions have exhibited innovative approaches. These demonstrate that changes are possible when political will is present. They also show options for the federation as a whole.

Komi Republic

3.6 The Komi Republic, located in the far north of European Russia, contains one of the last remaining expanses of *taiga* (old-growth dense forest) in Europe and the large Pechora oil basin. The region has launched a pioneering experiment in forest tax reform and might apply the same principles to oil. In January 2000, a new regional forest law came into force, which introduced the notion of timber rent and took steps towards withdrawing it.²⁸ The law applies a normative cost methodology: logging costs are determined using a series of engineering relationships based on the quality of the forest stand, distance to roads, soil quality, *etc.* These factors are objective rent-generating variables. Subtracting costs and a normal profit allowance from the market price of round wood gives the residual rent on timber. Using the new methodology, the average rent was estimated at RUB 100 per m³, and the total appropriated timber rent at around RUB 690 million, *i.e.* 6 times the regional budget for forest management and 8% of the total regional budget (Karakchiev 2000).

3.7 The average stumpage was RUB 10 per m³ fee in Komi in 1999, in other words just the federally mandated minimum rate. By the middle of 2000, stumpage fees ranged from RUB 6 to RUB 24 per m³, with an average of RUB 15. In effect, the new Komi forest law differentiated stumpage fees by determining a series of rent-generating coefficients in 11 different locations of the republic (instead of 4 formerly), and applying these coefficients to the standard minimal fees. This method results in more than twice as many stumpage fees as under the federally mandated scheme. Over a period of one year (first quarter of 2000 over first quarter of 1999), the weight of stumpage in the price of round wood rose from 4.8 to 6.1%, while the profitability of round wood production declined from 25 to 21%. On an annual basis, profitability is expected to decrease from 14.8% in 1999 to 13.5% in 2000. Despite the new coefficients, the regional administration estimates that no more than 6% of the timber rent is captured (GOK 2000; Obukhov 2000; Shutikov 2000).

²⁸ In Russian the timber rent is actually called forest rent (*lesnaya renta*), although what is meant is usually the rent on standing timber.

3.8 The forest revenue distribution key has also been modified, with the newly generated revenues being allocated partly to *leskhozy* for reforestation, and partly to the regional budget. The initial proposal for a regional forest fund to develop the forest sector in general was rejected by industrialists. Instead, a proposal is now tabled for such a regional fund to finance forest road building specifically.

3.9 The normative cost methodology is now being extended to the wood processing sector. Profitability calculations for the pulp-and-paper, chip, plywood and sawn goods branches have revealed that wood processing is appropriating rent. The Komi government is therefore contemplating raising stumpage fees further in order to capture part of this rent. For example, in the pulp-and-paper branch, one proposal consists of reducing the profit margin from 31% to about 25% by raising stumpage fees by RUB 13 per m³ of round wood.

3.10 Based upon the timber sector experiment, Komi is working on a draft federal law that would allow the region to apply the same methodology to other resources, in particular oil. The Komi experiment is a premiere in contemporary Russia. It falls short of a revenue-neutral shift, since no taxes have been cut as a result of the reform. Nevertheless, it takes a step towards capturing resource rents and turning them into public revenue. The impact on the region's forest revenue and overall fiscal position, the reaction of the forest industry (will firms relocate to neighboring regions?), *etc.* will need careful monitoring. If the reform turns out to be a success, it might trigger a demonstration effect.

3.11 Of course, care must be taken not to hurt the sector when removing the rent. Capturing the rent should not do away with profits. In particular, it could be argued that the profitability of 13.5% predicted for the year 2000 may be insufficient. Admittedly, one must keep in mind that profitability figures generally suffer from gross underestimation in Russia. Nevertheless, the impact of the reform on logging must be monitored. One must know whether timber prices have increased in real terms and find out the elasticity of round wood prices with respect to stumpage fees. A low elasticity would suggest that round wood prices are in fact insensitive to stumpage fees, and that the potential for withdrawing the timber rent is limited to loggers. It might then be that the Syktyvkar pulp-and-paper plant exercises oligopsony power (it consumes 36% of local round wood), which would severely constrain stumpage fee reform. If anything, the reduction in the profitability of logging indicates that loggers have shouldered part of the rise in stumpage fees instead of fully passing it on to customers.

Northern Territories

3.12 Leaning in part on Komi's innovative approach, the Government Committee of the Russian Federation for Northern Affairs, which until 2000 handled questions of economic development in the resource-rich northern territories (from Karelia in the west to Chukotka in the Far East), adopted a resolution to differentiate natural resource use payments to develop the regions' industrial base (Goskomsev 2000).

Samara Oblast

3.13 The region of Samara has decided to fill the legal and fiscal vacuum left by Article 41 of the 1992 Russian “Law on Use of the Subsoil,” which provides that “regular payments for the right the extract minerals are determined taking into account the type of mineral, the quantity and quality of their reserves, the natural, geographic, technical and economic conditions of their reclamation and exploitation of their deposit.” Samara Oblast has thus started differentiating mineral resource user fees to reflect rent-generating factors and capture part of the rent. It has implemented the 6-16% range set for oil and gas in the legislation so that now, for deposits with relatively advantageous conditions, fees range from 12.29% to 13.14%, while users of relatively disadvantaged deposits pay only 8-10.43% (Evtseva 2000).

A Practical Experiment: Novgorod Oblast

3.14 The forest sector used to figure prominently among the sources of revenues of this northwestern region of Russia. In 1904, for example, they represented 26% of total regional budget revenues (Novgorod Oblast 1965-1976-1986). This role was dramatically reduced with the new rules for stumpage fee calculation established in 1949 as well as the massive industrialization campaign undertaken by Stalin. By the 1960s, the share of forestry in regional budget revenues had been reduced to less than 5%. Nowadays, forest revenues play an even smaller role. The share of natural resource user fees in Novgorod’s consolidated regional budget revenues represented 2.7% in 1999, with stumpage fees accounting for half of that. The share of the whole forest sector in the region’s consolidated tax revenues is estimated at around 5%, or US\$ 3.4 million (GNIVTs 2000).

3.15 Eismont *et al.* have tried to overcome the problems of using the net-back method to estimate the timber rent in Novgorod (2001). As highlighted above, depending on the origin of the data, the net-back method can lead to serious uncertainties in the estimation process. The innovation of Eismont *et al.* (2001) consists of using timber auction data to estimate the timber rent econometrically.

3.16 The model assumes perfect competition among loggers and sets the rent equal to the auction price (stumpage fee). The auction price is a function of several explanatory variables: (1) timber type (coniferous vs. deciduous, with coniferous fetching higher prices than deciduous); (2) volume per tree (the higher the volume the higher the price); and (3) hauling distance (the smaller the distance the higher the price).

3.17 As a first step, a linear specification is used to estimate the rent:

$$P_A = c_1 + c_2 \cdot TYPE + c_3 \cdot QUALITY + c_4 \cdot DISTANCE \quad (4)$$

where P_A is the auction price (stumpage fee), and $TYPE$ is a dummy variable, representing timber type (one if coniferous, zero otherwise). The estimation results are as follows. Except for the constant, all of the estimated coefficients are of the correct sign and statistically significant at the 1% level:

$$P_A = -7.1458 + 18.3557 \cdot TYPE + 125.2861 \cdot QUALITY - 0.3187 \cdot DISTANCE$$

Std. Errors	(14.1155)	(2.5431)	(34.8736)	(0.0927)
t-statistic	(-0.5062)	(7.2177)	(3.5923)	(-3.4373)

3.18 The coefficients suggest that, *ceteris paribus*, coniferous wood is worth RUB 18 more per cubic meter than deciduous wood; as the volume per tree increases by one cubic meter, the price of timber increases by RUB 125; and as the distance from the forest plot to the market increases by one kilometer, the price of timber declines by RUB 0.32. The forest authority could use this simple model to set the price of timber sold outside of auctions: by entering the parameters of a given cubic meter, the equation will return its price.

3.19 Unfortunately, logging costs do not appear in the linear specification, which is why the following non-linear specification of the function defining auction price was also used:

$$P_A = c_1 + c_2 \cdot TYPE + c_3 \cdot QUALITY^{c_4} \cdot \exp(c_5 \cdot DISTANCE) \quad (5)$$

3.20 Equation (5) has a clearer economic interpretation than (4). The sum of the first two terms on the right-hand side correspond to the market price of timber for either deciduous (with $TYPE=0$) or coniferous (with $TYPE=1$) trees. The third term on the right-hand side stands for logging costs, which depend on timber quality and hauling distance. The difference between the market price for timber and logging costs is an approximation of the rent (stumpage value).

3.21 Estimation of equation (5) under engineering values for the coefficients c_4 and c_5 ($c_4 = 0.2644$ and $c_5 = 0.0043$) produced the following results:

$$PRICE = 178.6845 + 22.2406 \cdot TYPE - 102.6373 \cdot Q^{0.2644} \cdot e^{0.0043 \cdot d}$$

Std. Errors	(29.5923)	(3.1906)	(21.2042)
t-statistic	(6.0382)	(6.9705)	(-4.8404)

3.22 The problem with this method of estimation is the stability of the obtained results relative to the variation of the exogenously given parameters c_4 and c_5 . These two coefficients indeed vary with the logging technology employed. The engineering values noted above are based upon a traditional, mostly manual, logging technology, which is still prevalent in Russia. For more mechanized or fully mechanized technologies, the coefficients assume slightly different engineering values. To assess the robustness of the estimation one may calculate the values of the coefficients c_1 , c_2 and c_3 as a function of different parameter values, e.g. the values given above $\pm 50\%$. This procedure reveals that the estimation may be regarded as robust.

3.23 This econometric approach predicts logging costs well below reported costs, which may be due to the facts that: (1) auction prices do not include road building costs (auctions concern short-term felling rights without road-building obligations); (2) loggers participating

in auctions are more competitive than those who do not; and (3) reported logging costs are artificially bloated to avoid taxation.

3.24 This approach also predicts market prices for timber well below actual market prices (around RUB 200 as opposed to RUB 400). One reason is that administrative and marketing costs have not been taken into account in (5). Another possible explanation is the presence of market power. Novgorod Oblast counts as many as 300 logging companies producing an average of only about 7,000 cubic meters per year. These small loggers may find themselves subject to non-competitive practices by buyers and intermediaries. Further research is needed to determine the ratio of timber buyers to sellers and test the market power hypothesis.

IV. SOME POLITICAL ECONOMY DIMENSIONS OF NATURAL RESOURCE RENT TAXATION IN RUSSIA

Natural Resource Taxation and the Non-Payments Problem

4.1 Since the end of communism the Russian economy has been plagued, in some cases crippled, by non-payments. “Non-payments” refer to financial obligations not settled in cash or not settled at all. As the problem spread in Russia, the formal economy became increasingly cash-strapped. In-kind payments, barter and a range of promissory notes with low credibility and limited geographical recognition took over as the prevalent means of payment, and arrears accumulated, eventually contributing to the meltdown of August 1998. Natural resource sectors were far from immune, indeed they were, and arguably still are, at the heart of the non-payments problem.²⁹

4.2 It is the energy sector that played a central role in the non-payments story. Over 60% of the oil produced in Russia is sold domestically or in the CIS, and non-payment problems existed throughout this supply chain. In addition, many of the wholesale transactions in the domestic sector were handled on a barter basis. Cash transactions did take place at the gasoline pump but suppliers further up the chain did not access this cash, and neither did tax authorities (Thomson 1998).

4.3 Utilities, in particular RAO UES, the public electric monopoly, and its network of regional subsidiaries subsidized inefficient local companies by providing them with cheap or free electricity. Since these companies were not able to pay for their energy bills, RAO UES had trouble paying its own suppliers (Gazprom, and oil and coal producers mainly) and all of them failed to meet their tax obligations to the government. As a result, the state coffers yearned for cash to support Russia’s extensive social safety net (Pinto *et al.* 2000).

²⁹ In the forest sector, one of the symptoms was the low collection rate of stumpage fees. For example, in the Far Eastern region of Khabarovsk, about 63% of forest fees were collected in June 1997. This ratio fell to 36% in June 1998, time at which the backlog in unpaid forest fees amounted to US\$ 17 million (Markandya *et al.* 1999).

4.4 To dismantle the non-payments problem, it is key to involve natural resource producers, especially oil and gas companies. By requiring that they pay their taxes in cash and on time, the government would give them an incentive to recover costs from their customers, in spite of regional and local pressures that they abstain from doing so. In addition, by liberalizing energy sales, in particular by removing restrictions on energy exports, the government would help clear the glut on the domestic market, thus enhancing realized rent. Part of the additional realized rent could then be captured through more effective rental payments. This process would likely unlock large amounts of cash, which could be used, in a more discriminate way than today, to alleviate the social consequences of full energy cost recovery.

4.5 Under government pressure, timely, in-cash tax payments by oil and gas companies increased in 2000, according to the Ministry of Taxation. Energy suppliers now also more commonly demand that their customers pay their bills, lest they be disconnected. However, non-payments are still believed to be rampant.

Fiscal Federalism

4.6 Questions of resource ownership are traditionally sensitive in Russia. Land is no exception. For years now, the federal Duma has been discussing a draft Land Code, whereby a legal framework would be designed for the privatization of land. No significant progress has been made, and the total amount of Russian land held in private property is truly negligible.

4.7 The ownership of natural resources is equally controversial. Natural resource tax revenues are shared among the three levels of government in Russia, and natural resource tax revenue assignment is a sensitive matter. Article 72 of the Constitution of the Russian Federation provides for the joint jurisdiction of the federal government and its 89 subjects (members of the Federation) over “issues of the possession, utilization and management of land and of sub-surface, water and other natural resources” and “administrative, administrative-procedural, labor, family, housing, land, water and forest legislation; legislation on subsurface resources and on environmental protection.” The Constitution thus remains vague on who has authority with respect to possession, utilization and management. Not surprisingly, the federal and sub-national governments often disagree on how to share the fiscal revenues from natural resources (McLure 1994; McLure *et al.* 1996). For instance, in 1997-1998, the governors of the regions of Karelia and Khabarovsk challenged the federal ownership of forests before the Supreme Court, but lost.

4.8 The contention over sharing natural resource tax revenues also has to do with the regional concentration of these resources. Most oil and gas production is located in two autonomous regions (Khanty-Mansi and Yamalo-Nenets). About three-fourths of all metal production originate from 10 regions. Natural resource revenues are thus highly concentrated in a small number of regions. For instance, in 1997 the three regions best endowed in natural resources collected 47% of the sum of regional revenues from taxes, fees and charges on natural resources (Klotsvog and Kushnikova 1998; USGTAT 1998a).

4.9 The literature on fiscal federalism has touched upon the assignment of natural resource tax revenues. Generally speaking, arguments in favor of assigning revenues to the federal government include: (1) regional revenue stability; (2) allocative efficiency; (3) horizontal equity; and (4) the communal property of the natural resource heritage. On the other hand, arguments in favor of assignment to sub-national governments include: (1) compensating for the negative externalities suffered locally due to resource exploitation; (2) the local heritage of natural resources; and (3) the prevention of secession from the Federation because of fiscal abuse (McLure 1994; McLure *et al.* 1996; USGTAT 1998b).

4.10 Table 19 shows how the revenues collected from some natural resource and environmental taxes are supposed to be shared among the various levels of government.

Table 19. Statutory Assignment of Selected Natural Resource Revenues in Russia
(in percentage)

User fee type	Federal share	Regional share	Local share
Subsoil user fees (oil and gas)	40	30	30
Subsoil user fees (other than oil and gas)	25	25	50
Subsoil water user fees	40	60	0
Oil excises	100	0	0
Gas excises	100	0	0
Oil replacement fee ^a	20 (100)	20 (0)	0
Forest user fees ^b	40	60	0 (100)
Surface water user fees	40	60	0
Aquatic biological resource user fees ^c	100	0	0
Pollution charges ^d	19	27	54
Water supply, sewage and treatment ^e	0	0	100
Land taxes and rentals	30	20	50

- a) 20% to the federal fund for mineral base replacement and 20% to the regional fund for mineral base replacement. The remaining 60% stays in the company conducting exploration activities, depending on the clauses of the *ad hoc* agreement with the Ministry of Natural Resources. If the company does not conduct such activities itself, 100% flow to the federal fund for mineral base replacement.
- b) The breakdown corresponds to the revenues from minimal stumpage fees. Excess stumpage fees accrue to the local *leskhozy*.
- c) The receipts are sent to the federal fund for the management, research, protection and reproduction of biological resources.
- d) Divided into general budget revenues and earmarked budgetary environmental funds: the federal share breaks down into 10% to the federal budget and 9% to the federal environmental fund; the regional and local shares accrue to the regional and local environmental funds, respectively.
- e) All proceeds go to municipal water utilities for cost recovery.

Sources: East West Institute (1999); GOR (1996); IFEI (1998); Roskosnaya (2000); Summers (2000); Titova (2000); USGTAT (1998a); Ezhov (2000).

4.11 It is interesting to note that of those categories, only four (subsoil user fees, pollution charges and land payments) are shared across the three levels. Three categories (oil and gas excises and aquatic biological resource user fees) flow to the federal level exclusively. One category (water supply, sewage and wastewater treatment fees) accrues to the local level only.

4.12 These are statutory, not actual rates, however. As Table 20 indicates, actual data show greater shares staying at the regional and local levels, as regions and municipalities often resent remitting all the revenues due to the federal budget.

Table 20. Actual Revenue Sharing Among Levels of Government (1998)

	Federal		Regional		Local		Total	
	RUB bn.	% Share	RUB bn.	% Share	RUB bn.	% Share	RUB bn.	% Share
CPT	35	38	36	39	21	23	93	100
PIT	0	0	26	37	44	62	71	100
VAT	105	67	33	21	19	12	156	100
Excises	52	77	12	17	4	6	68	100
Property tax	0	0	23	49	24	51	47	100
"Green taxes"	3	14	9	41	10	45	23	100
Foreign trade taxes	37	100	0	0	0	0	37	100
Other taxes	4	8	14	30	30	63	48	100
Total tax revenues	236	44	154	28	153	28	542	100
Non-tax revenues	40	45	14	43	10	12	64	100
Budget funds	26	59	18	41	0	0	44	100
Total revenues	302	46	186	29	163	25	650	100

Source: USGTAT (1998a).

4.13 In contrast to Table 19, which indicated that the law mandates regions to direct the larger share of natural resource tax revenues to the federal government, Table 21 shows that regions and municipalities instead retained as much as 86% in 1998. With respect to the impact of fiscal federalism on the feasibility of a shift to rental payments, two main issues arise. First, would regions raise the tax burden on natural resources if they knew they would have to relinquish part of the resulting revenues to Moscow? As Table 20 suggested, sub-national governments do end up retaining the bulk of natural resource revenues. Second and more importantly, could Russia, as a federation, sustain a tax system relying more heavily on natural resources? Revenue disparity across regions is at the heart of the problem.

4.14 A shift from capital and labor taxes to rental payments could be criticized because it risks heightening regional revenue disparity. The argument would go as follows. First, natural resource endowments vary greatly across regions, so that resource-poor regions would find it hard to sustain themselves on natural resource revenues. Second, regions remit relatively smaller shares of their natural resource tax revenues to the federal budget than other tax revenues. Not only do sub-national governments retain a larger share of the

revenues than the federal government, they fail to remit even the statutory federal share, as Table 20 revealed. So, if the share of natural resource taxes increases, the federal budget would be expected to suffer some losses.

4.15 The first argument is flawed. In Russia, natural resource tax revenues *per capita* are highly correlated with non-natural resource tax revenues *per capita*. The correlation coefficient was 0.906 in 1997 (USGTAT 1998b). In other words, resource-poor regions find it hard to sustain themselves with high or low reliance on natural resource taxes because they do not have a solid tax base. The shift does not make matters any worse. Interregional subsidies are currently needed to help poor regions and would still be needed after the role of natural resource taxes has been enhanced.

4.16 As to the second risk, it is real but can be mitigated. Greater centralization of natural resource revenues, and redistribution of the revenues on a needs basis, may be necessary to make the natural resource taxation reform sustainable in a federal context. This is in fact what the Putin administration is proposing to do by federalizing a greater proportion of the natural resources not equally distributed across regions (essentially hydrocarbons and precious metals): “the basic *federal taxes* should be: customs duties, the VAT, excise taxes (paid by business firms), the federal profit tax (corporate income tax on enterprises and organizations), the personal income tax, payments for use of natural resources which are not uniformly distributed (above all for extraction of raw hydrocarbons and other raw material resources for export), and federal licensing and registration fees.” (GOR 2000, 162)³⁰ In addition, unlocking the rent would inject more cash into the state’s finances, only a portion of which would be retained by the region. The federal government could therefore witness a net inflow of revenues.

A Hypothetical Example: Timber Rent Tax Reform

4.17 This section envisions the potential response to increased taxation of rent grounded in the withdrawal of the timber rent. This simple political analysis gives some insight into the future of natural resource tax reform, in particular by trying to identify the political constituency at the federal, regional and local level. At least 10 different types of stakeholders can be distinguished, including the three levels of government (federal, regional and local), the three branches of authority of the Forest Service, the three main groups of protagonists in the forest industry (loggers, processors and vertically integrated companies), and traders. All stakeholders are interested in forest rents, though for different reasons. For simplicity purposes, we assume that increases in rental payments would materialize through increases in stumpage fees.

³⁰ The distinction between “uniformly distributed” and unevenly distributed natural resources is somewhat artificial since the disparity in natural resource endowment is not just driven by the absolute quantities of resource reserves, but also by the inherent value (rent) of those reserves, which is itself a function of quantity, quality and distance to market. Siberia, for example, is well endowed in timber and fossil fuels, but the distance to the market raises costs tremendously, so that it may not be economically feasible to exploit the corresponding endowments.

4.18 Table 21 attempts to summarize the expected reactions to the proposed tax shift, deconstructing the response for each measure making up the policy package. Each measure (A through I) is scored based upon the response expected from each stakeholder.

Table 21. Predicted Initial Responses to Timber Rent Tax Reform

		Forest Service			Administration			Forest industry			
		Federal	Regional	Local	Federal	Regional	Local	Loggers	Processors	VIC *	Traders
Measure proposed		1	2	3	4	5	6	7	8	9	10
A	Better definition of forest costs	+	+	+	+	+	+	-	-	-	?
B	Better knowledge of forests	+	+	+	+	+	+	?	?	?	?
C	Better use of forests	+	+	+	+	+	+	?	?	?	?
D	More transparent forest auctions	+	?	?	+	?	?	?	?	?	?
E	Regulation of timber oligopsony	+	?	?	+	?	?	+	?	-	-
F	Limit <i>leskhoz</i> y to management	+	?	-	+	?	?	+	+	+	?
G	Differentiate stumpage fees	+	+	+	+	?	?	-	-	-	-
H	Forest revenue recycling	-	-	-	?	+	+	+	+	+	+
I	Earmark for forest management	+	+	+	-	-	-	+	-	-	-
TOTAL SCORE		7	4	3	6	3	3	2	-1	-2	-2

* VIC means vertically integrated company.

“+” means favorable and equals +1; “-” means unfavorable and equals -1; “?” means difficult to predict and equals 0.

4.19 Each measure receives a score between 1 (well received) and -1 (rejected). Scores are then totalled per stakeholder. A total score of +9 suggests that the stakeholder accepts all measures; -9 means the stakeholder is opposed to all measures. The measures are the following: (A) to better define forest costs, *i.e.* to know more accurately how much it costs to produce timber depending on local conditions. Once costs are known with greater certainty, stumpage rates can also be set more precisely; (B) to develop a better knowledge of forests implies better inventories of timber and non-timber resources, so that sellers and buyers ascertain more accurately the value of the standing plot to be logged; (C) to improve the use of forests means, *inter alia*, putting up for sale the most appropriate timber plots, encouraging more rational logging, *etc.*; (D) making forest auctions more transparent means

making them more competitive, so that the rent is more properly revealed and captured; (E) regulating the timber oligopsony means curbing the market power possibly exercised by wood processors and intermediaries in the forest business. The objective is to ensure greater competition and openness in market relations; (F) *leskhozy* need to limit their activities to their core function of forest management and refrain from carrying out commercial activities; (G) stumpage fees need to be differentiated to better reflect site-specific rent-generating conditions; (H) recycling means that the revenues of higher stumpage fees will be used to reduce taxes on capital and labor; (I) revenues could be earmarked, *i.e.* reserved for investments and expenditures on forest management and environmental protection.

4.20 The *Federal Forest Service* (FFS)³¹ favors all measures fostering better forest management. It would oppose the use of forest revenues for other purposes than forestry. The earmarking proposal would certainly be well received.

4.21 The *regional branch of the Forest Service* (RFS) should look favorably at improved forest management. Its position is less clear regarding the regulation of wood markets, as it may have a vested interest in non-transparency and market distortions. The RFS, may be divided on forest revenue recycling.

4.22 For reasons similar to those invoked for the RFS, the reaction of the *leskhozy* is expected to be positive on the aspects of forest management, but less predictable with respect to market regulation. Their reaction should be negative on the question whether to confine *leskhozy* in their legally defined function of forest management. Of all actors, *leskhozy* should be the most favorable to increases in stumpage fees, since the 1997 Forest Code mandates that all revenues above minimal stumpage rates be directed to *leskhozy*. They are expected to oppose the recycling of those additional forest revenues.

4.23 The *federal administration* should look favorably upon all the measures proposed, with the possible exception of revenue recycling and the exception of earmarking revenues for forest management. The Ministry of Finance, for example, might think it wiser to let the additional forest revenue swell the federal coffers.

4.24 Similarly to the RFS, the *regional administration* will likely react positively to the proposed improvements in forest management. It would be equally ambivalent regarding the proposed market regulation. In contrast to the RFS and the federal administration, the regional administration would be divided on the issue of a raise in stumpage fees. Since increased stumpage fees mean additional revenues and possibly also a more competitive timber market, the regional administration should favor increases in stumpage fees. However, it is also concerned to develop the regional forestry sector by attracting new investors. The regional administration should support forest revenue recycling to cut taxes on capital and labor.

³¹ The FFS was placed under the authority of the Ministry of Natural Resources in May 2000. Environmental organizations have voiced their concern that the Ministry of Natural Resources will promote a more intensive use of natural resources, including timber, perhaps at the expense of environmental protection.

4.25 The *local administration* reacts as the regional administration.

4.26 *Logging firms* would not welcome the tightening in forestry cost accounting if these rules hurt their profitability. They should be indifferent to improvements in forest management, favorable to measures designed to curb oligopsonistic power in the timber market, hostile to increases in stumpage fees, favorable to forest revenue recycling (especially if recycling helps reduce their tax burden), and favorable to earmarking as this helps ensure long-term supplies of raw materials.

4.27 *Wood processors* would react in a way similar to loggers, except on the question of oligopsony regulation, as some processing firms benefit from oligopsony.

4.28 *Vertically integrated companies* (VIC) combine the functions of logging, processing and sometimes also trading. They will respond positively to the confinement of *leskhozy* in forest management and to forest revenue recycling but negatively to proposals hurting their profitability.

4.29 *Wood traders* should generally be hostile to the measures designed to capture some of the rent currently appropriated by traders. They would welcome revenue recycling. They should be indifferent to changes in cost accounting rules, though this could ultimately have an effect on market prices as well.

Volatility of Commodity Prices

4.30 The feasibility of a natural tax reform must be considered in the context of the volatility of primary commodity prices. The price of oil, to name but one commodity, has varied greatly over the past two years alone, rising from US\$ 10 to US\$ 30 a barrel. Russia, as an oil exporter, has greatly benefited from this rise through additional export earnings and export tax revenues. In times of high world market prices, the rent of natural resources is high, heightening the potential of rent capture. On the contrary, when prices are low, excess profits are also lower, and so is the ability of the government to extract more rent.

4.31 This has important implications for a revenue system in which the share of rental payments is expected to grow and gradually replace taxes on labor and capital. Among the qualities of a good tax system is a stable level of revenues. Since resource rent can vary significantly in the course of time, and the government is mostly powerless in the face of fluctuations in international commodity prices, it is unlikely that rent should replace all other sources of revenues in any given economy. However, further research would be needed to compare the relative stability of rent and income to determine where the fluctuations are the smallest.

4.32 Moreover, the rent on land is not the same as the rent on resources. Land rent shows greater stability over time than resource rent, as it is more closely associated with economic growth and perhaps less affected by international cycles. This suggests that a land tax should generally be contemplated as a way to finance a shift towards natural resource taxes. The difficulty of applying this approach to Russia is the lack of a land market to reveal the rent.

4.33 Even though taxing resource rents would not suffice to provide revenue stability, this realization should not deter the government from assessing resource rent and taking steps to capture it when it is positive. Stability of revenues requires diversifying revenue sources and efficiency in resource allocation requires removing tax distortions. A balance must be struck between these two potentially conflicting objectives.

V. CONCLUSION

5.1 Despite their importance in the Russian economy, natural resources do not contribute as much as they should to public revenues and private interests appropriate significant resource rents. Several natural resource taxes are set regardless of market prices or production costs. Such taxes favor profitable deposits and penalize marginal ones. The natural resource sector supplies a large amount of revenues to the budget, but mostly through taxes on the value that is added to natural resources, not the value, *i.e.* rent, of resources themselves.

5.2 The appropriated rent on crude oil, natural gas and standing timber was estimated. What was estimated was the current average rent. Through rent should theoretically be estimated in an intertemporal framework, the data necessary to carry out such an analysis, in particular reliable discount and inflation rates and marginal cost and revenue stream estimates, were not available. Auction data, which could help measure and collect the rent, were equally absent, except in the case of timber in Novgorod Oblast. For the other estimations, the method consisted of netting out costs from commodity prices.

5.3 The sum of appropriated rents on oil and natural gas alone represented about 18% of consolidated tax revenues in 1999. In other words, if the appropriated rent on oil and gas had been captured by the government, all taxes at the federal, regional and municipal levels could have been cut by 18%.

5.4 The current tax reform explicitly aims to reduce the tax burden on capital and labor so as to stimulate investment and employment. Green tax shifting would help realize these objectives without running a budget deficit. The Putin Administration seems aware that natural resources are inadequately taxed and has proposed that the public finance role of rental payments should be enhanced and these payments should be differentiated according to the objective conditions.

5.5 Failure to tax away the rent negatively affects the economy in several ways. First, public revenues must be raised elsewhere, *i.e.* on capital and labor. Most taxes discourage what is being taxed. Capital taxes discourage investments and labor taxes discourage employment. Investment and employment are exactly what should be stimulated to foster the reorganization of the Russian economy. As long as rents remain insufficiently taxed, resource extraction will continue to attract resources that could otherwise be allocated to activities with higher value added and greater labor intensity, such as manufacturing and services.

Russia has indeed suffered from the Dutch disease since it began its transition to a market economy. The exports of primary commodities, in particular oil and gas, increased, while the domestic production of tradable goods, in particular agriculture, plummeted. With overvalued real exchange rates propped up by massive capital inflows, the consumption of imported goods rose at the expense of domestic production. This reallocation of factors of production was also associated with higher income inequality, since the income of resource extraction and spin-offs as financial services is concentrated in a small fraction of the population (Gelb 2001).

5.6 Second, it is unlikely that the rent appropriated is reinvested in productive capital, which is a requirement for sustainable development. For example, Russians keep huge holdings of US dollars at home and abroad through capital flight. In the short term, these liquid assets do not return to the Russian economy.

5.7 Third, the failure to capture more rent causes a monetary imbalance. With high oil prices, large amounts of foreign exchange are earned. The legislation obliges oil exporters to sell 75% of their earnings to the Central Bank. For the Central Bank to buy this foreign currency, it prints rubles. Thus, it increases the money supply and risks fueling inflation. One proposal to sterilize this increase in the money supply is for the Ministry of Finance to pay its debt to the Central Bank. Another one is to allocate higher oil export tax revenues to a budgetary fund earmarked for enterprise reorganization (World Bank 2000b). Alternatively, windfall revenues could be used to cut traditional taxes.

5.8 There is a variety of ways in which economic rent can be captured, including auctions and taxes. Competitive auctions allow to measure and collect the rent. However, auctions are still undeveloped in Russia. They need to be encouraged and made more transparent. In parallel, taxes still need to be used, in particular differentiated required payments. Insofar as differentiated required payments capture rent and create incentives for better resource management, they should be privileged over unrequited payments. For example, profit taxes do not guarantee stable revenues to the government in light of poor accounting and auditing. They incite firms to conceal revenues and bloat costs, in particular labor costs, in order to minimize taxes. As a result, the government is at risk of receiving little revenue from resource ownership (Conrad and Shalizi 1988; Conrad *et al.* 1990; Nellor and Sunley 1994). For their part, export duties distort resource allocation. As accounting and auditing improves, the government should be able to rely increasingly on pure resource rent taxes. If such a system were ushered in immediately, however, the risk of profit concealment by resource producing firms would be serious. An additional advantage of required over unrequited payments is that Russian regions are generally entitled to increasing the former but not the latter. In particular, regions are authorized to raise (and lower) user fees.

5.9 A well-differentiated system of resource user fees requires site-specific information, which in the case of Russia represents significant challenges. The administrative costs of such a system could be high and administrative abuse is possible, but the alternative is the current system, which also contains arbitrary elements and generates little revenue. Moreover, the current legislation for capturing rent, which includes oil royalties and timber

stumpage fees, does provide for proper differentiation. Building upon the existing system instead of afresh is an additional advantage of using required payments in Russia.

5.10 Among required payments, user fees should be used rather than property taxes. In addition to being more adequate from an ecological perspective (certain resource uses, not the resources themselves, are the bads to be discouraged), user fees obviate the ownership question. This is precious, especially in light of the tribulations of the new federal Land Tax code and other arduous questions of resource ownership.

5.11 Once the rent is captured, the state could use it to cut the tax burden on labor and capital, and possibly investing it in public programs. The Russian or Soviet state has traditionally been the principal investor in the economy, with very mixed records judging by market economy standards. Rent could also be consumed, but this would conflict with the rule that all rents on exhaustible resources should be reinvested in human and machine capital in order to maintain future income levels. Eventually, even the appropriated rent is reinvested, but the question is to know how. It is only legitimate to expect that a social good should retain its social value. The accumulation of private assets with little or no social return would not qualify as appropriate reinvestment of the rent.

5.12 There is little doubt that the socialization of rent would meet a barrage of opposition from influential interests currently appropriating the rent. Nevertheless, it is the collective welfare of the present and future Russian generations that is at stake.

ANNEXES

Prices and Costs in the Oil Extracting Industry

	(US\$/ton)			
	1999		2000	
	No transfer pricing	Transfer pricing	No transfer pricing	Transfer pricing
Export share (of oil extracted)	37.5%	37.5%	39.0%	39.0%
Sales price	110.5	110.5	177.9	177.9
Export duty	4.8	4.8	20.9	20.9
Customs fee	0.1	0.1	0.2	0.2
Transportation to export gate	13.7	13.7	14.2	14.2
Border price ^a	91.9	91.9	142.6	142.6
Share of domestic and CIS sales (of oil extracted)	62.5%	62.5%	61.0%	61.0%
Domestic sales price ^b	44.5	27.1	67.1	37.4
Average price for tax estimation ^c	62.2	27.1	96.5	37.4
Oil excise	2.2	2.2	2.0	2.0
Average price for tax estimation ^d	60.0	24.9	94.6	35.4
Subsoil user fee (royalty)	5.2	2.1	8.1	3.0
Mineral replacement fee	6.0	2.5	9.5	3.5
Road tax	1.6	0.6	2.5	0.9
Labor (including auxiliary personnel)	3.0	3.0	3.2	3.2
Depreciation	2.5	2.5	2.4	2.4
Production costs ^e	6.2	6.2	6.8	6.8
Payroll taxes to extra-budgetary funds	1.2	1.2	1.2	1.2
Housing tax	1.0	0.6	1.5	0.9
Other taxes	0.5	0.5	0.7	0.5
Gross profit	32.9	5.6	58.6	12.9
Profit tax	8.3	5.0	14.3	8.2
Capital investments (excl. mineral replacement fee)	7.6	7.6	13.5	13.5

a) Delivered at frontier, *i.e.* export gate.

b) Delivered at the junction between local producer's and main pipelines, before VAT.

c) Excluding VAT, tariffs and transportation.

d) Excluding VAT, tariffs, excises and transportation.

e) Except labor costs, taxes and depreciation.

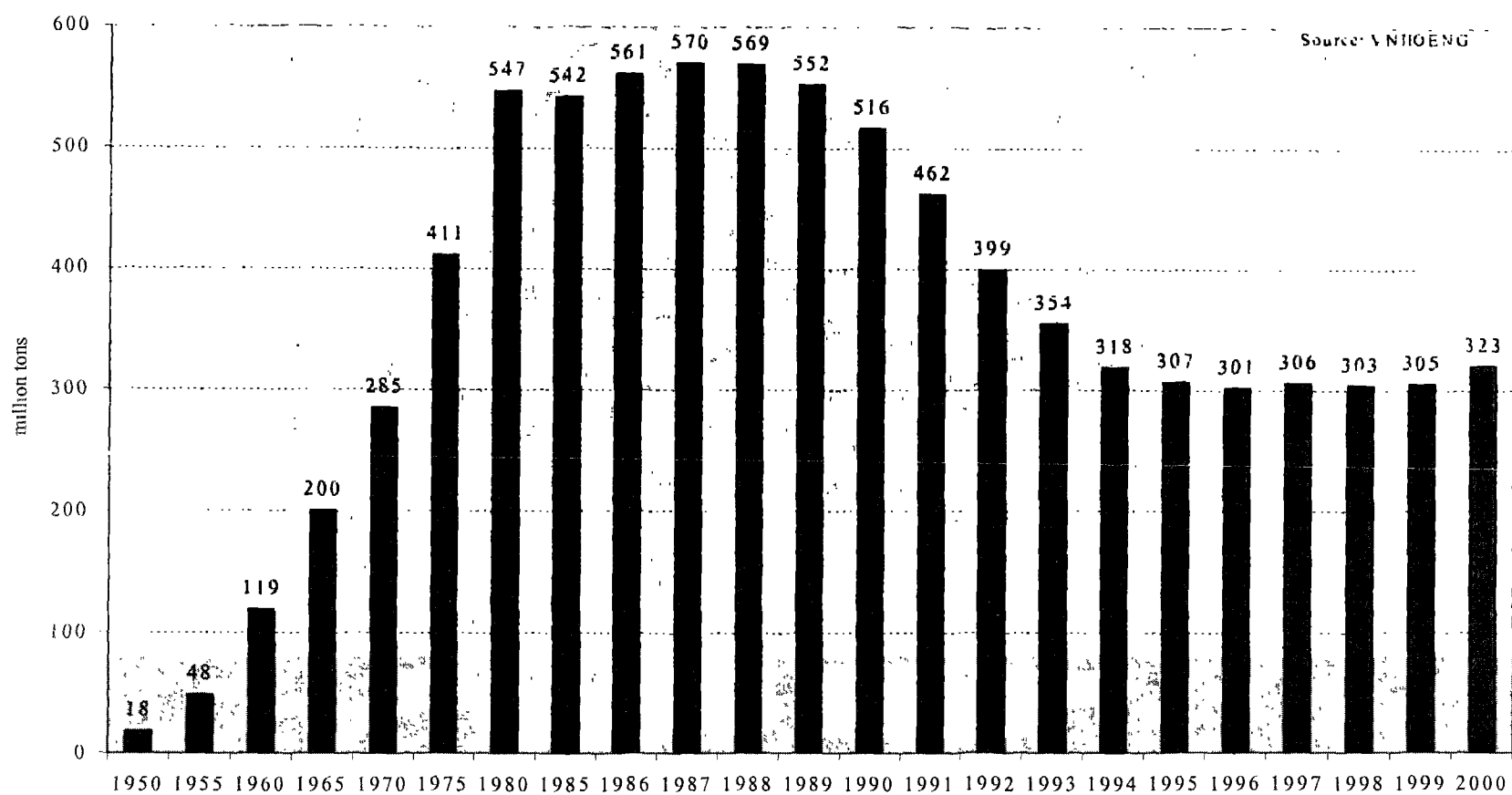
Source: IFEI (2000).

Estimation of Rent in Natural Gas Production

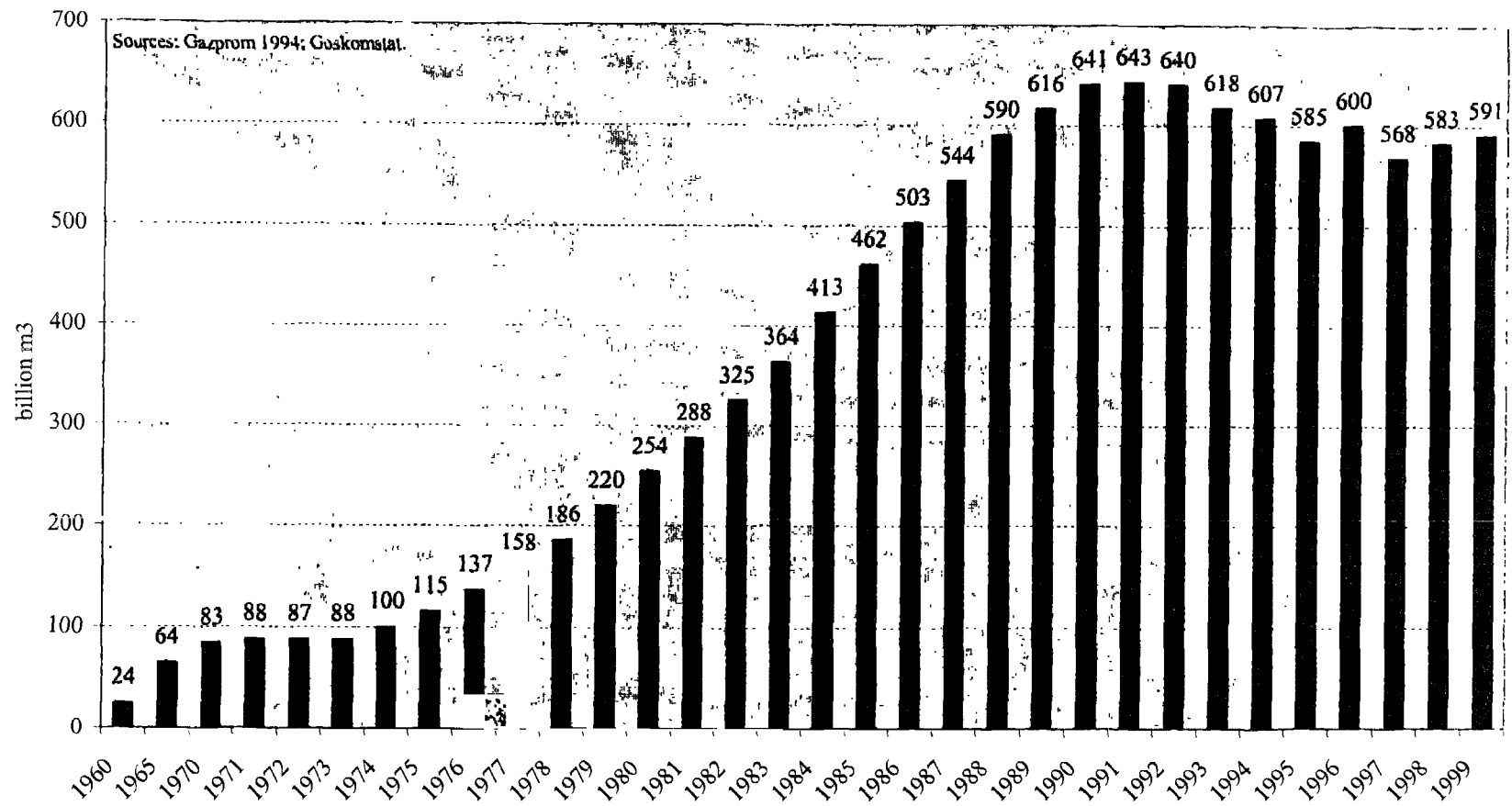
(US\$/thousand m ³)	
Extraction	100%
Use for enterprises' own needs	11.4%
Share of domestic sales	57.9%
Wholesale price	9.80
VAT	1.63
Gas excise	1.22
Price without taxes	6.94
Share of exports	30.7%
Border price	62.24
International transport (abroad)	10.20
Export duties	2.60
Gas excise	14.83
Price without taxes	34.61
Net proceeds from sales	14.63
Transportation cost	2.19
including labor	0.30
depreciation	0.62
Production cost	0.91
including labor	0.10
depreciation	0.33
Marketing costs	0.03
including labor	0.02
depreciation	0.00
Gas purchase from independent producers	0.11
Social security contributions	0.16
Road tax	0.48
Housing tax	0.29
Property tax	0.24
Price used by Gazprom in transfers to subsidiaries	1.94
Subsoil user fee (royalty)	0.29
Mineral replacement fee (VSMB)	0.19
Other taxes on subsoil use	0.05
Profit on sales	9.81
Profit tax	0.84
Capital investments (excluding VSMB)	4.90

Source: IFEI (2000).

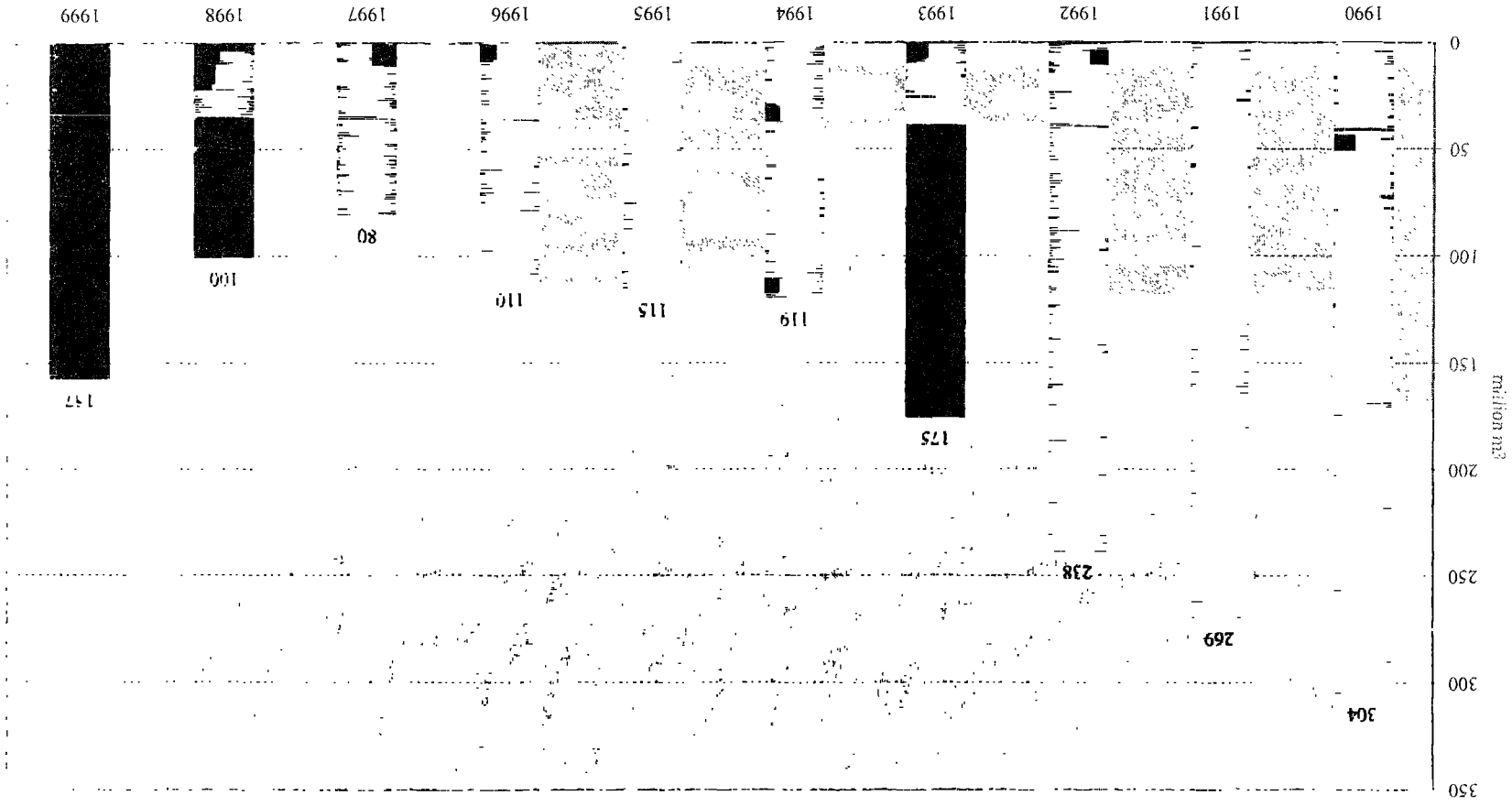
Oil Extraction in Russia



Natural Gas Production in Russia



Timber Harvest in Russia



Estimates of Timber Rent in Selected Russian Regions – Equity Technique

(US\$/m³)

Regions	Arkhangelsk		Khabarovsk		Krasnoyarsk		Leningrad		Moscow		Novgorod		Pskov		Vologda	
	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.
Revenues (CIF price)	16.7	37.9	31.1	72.2	28.0	120.2	16.9	25.6	16.9	26.0	22.3	35.8	20.6	32.5	16.2	24.0
Cost of sales	10.8	17.8	22.6	59.0	30.3	75.3	11.5	17.0	12.5	15.4	18.3	28.4	12.0	14.1	13.1	18.7
Normal profit *	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Tax take (notional)	2.7	8.8	3.0	7.0	1.2	19.4	3.8	6.2	2.3	5.5	2.1	6.3	4.7	9.2	1.5	3.3
Appropriated rent	1.6	9.6	3.9	4.6	-5.1	23.9	0.0	0.8	0.5	3.5	0.3	-0.5	2.3	7.5	0.0	0.3
Weighted average rent	2.0		4.3		3.6		0.3		0.9		0.0		3.4		0.0	
Foregone revenues (US\$ mn/yr)	21.5		22.2		28.0		1.6		0.5		0.1		4.1		0.2	

NIPIEILesprom	Arkhangelsk		Khabarovsk		Krasnoyarsk		Leningrad		Moscow		Novgorod		Pskov		Vologda	
	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.
Revenues (CIF price)	16.7	37.9	31.1	72.2	28.0	120.2	16.9	25.6	16.9	26.0	22.3	35.8	20.6	32.5	16.2	24.0
Cost of sales	11.4	18.3	11.8	48.1	13.5	58.6	5.6	11.1	10.4	13.3	8.2	18.3	5.0	7.1	8.9	14.5
Normal profit *	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Tax take (notional)	1.6	7.7	5.8	9.8	4.3	23.2	3.4	5.7	1.9	5.1	4.2	7.0	4.7	9.2	2.2	4.0
Appropriated rent	2.1	10.1	11.9	12.6	8.5	36.8	6.3	7.1	2.9	5.9	8.3	8.8	9.3	14.5	3.5	3.8
Weighted average rent	2.5		12.3		17.0		6.6		3.3		8.5		10.3		3.5	
Foregone revenues (US\$ mn/yr)	26.9		63.2		131.9		32.5		2.0		26.4		12.6		30.0	

Dom= Domestic; Exp= Export.

Sources: Arkhangelsk forest committee (regional average); Khabarovskii Krai administration (regional average); Krasnoyarskii Krai forest committee (based upon 2 firms); Leningrad Oblast forest industry committee (regional average); Moscow: VIPKLKh (regional average); Novgorod: Novgorodlesprom (based upon several firms); Pskov forest committee (based upon 1 firm); NIPIEILesprom.

Estimates of Timber Rent in Selected Russian Regions – Costs Technique

(US\$/m³)

Regions	Arkhangelsk		Khabarovsk		Krasnoyarsk		Leningrad		Moscow		Novgorod		Pskov		Vologda	
	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.
Revenues (CIF price)	16.7	37.9	31.1	72.2	28.0	120.2	16.9	25.6	16.9	26.0	22.3	35.8	20.6	32.5	16.2	24.0
Cost of sales	10.8	17.8	22.6	59.0	30.3	75.3	11.5	17.0	12.5	15.4	18.3	28.4	12.0	14.1	13.1	18.7
Normal profit *	1.0	1.0	3.0	3.0	3.7	3.7	1.4	1.4	0.9	0.9	2.0	2.0	1.1	1.1	1.3	1.3
Tax take (notional)	2.7	8.8	3.0	7.0	1.2	19.4	3.8	6.2	2.3	5.5	2.1	6.3	4.7	9.2	1.5	3.3
Appropriated rent	2.3	10.3	2.6	3.2	-7.1	21.8	0.2	1.1	1.2	4.2	0.0	-0.9	2.8	8.0	0.3	0.6
Weighted average rent	2.7		2.9		1.5		0.6		1.6		-0.3		3.8		0.3	
Foregone revenues (US\$ mn/yr)	28.6		15.1		12.0		3.0		1.0		-0.9		4.7		2.6	

NIPIEILesprom	Arkhangelsk		Khabarovsk		Krasnoyarsk		Leningrad		Moscow		Novgorod		Pskov		Vologda	
	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.	Dom.	Exp.
Revenues (CIF price)	16.7	37.9	31.1	72.2	28.0	120.2	16.9	25.6	16.9	26.0	22.3	35.8	20.6	32.5	16.2	24.0
Cost of sales	11.4	18.3	11.8	48.1	13.5	58.6	5.6	11.1	10.4	13.3	8.2	18.3	5.0	7.1	8.9	14.5
Normal profit *	1.0	1.0	1.4	1.4	1.2	1.2	0.5	0.5	0.6	0.6	0.4	0.4	0.1	0.1	0.7	0.7
Tax take (notional)	1.6	7.7	5.8	9.8	4.3	23.2	3.4	5.7	1.9	5.1	4.2	7.0	4.7	9.2	2.2	4.0
Appropriated rent	2.7	10.7	12.2	12.8	9.0	37.3	7.4	8.3	3.9	6.9	9.5	10.0	10.8	16.0	4.4	4.7
Weighted average rent	3.1		12.6		17.5		7.8		4.3		9.7		11.8		4.4	
Foregone revenues (US\$ mn/yr)	33.1		64.5		135.3		38.1		2.6		30.1		14.4		37.7	

Dom= Domestic; Exp= Export.

Sources: Arkhangelsk forest committee (regional average); Khabarovskii Krai administration (regional average); Krasnoyarskii Krai forest committee (based upon 2 firms); Leningrad Oblast forest industry committee (regional average); Moscow: VIPKLKh (regional average); Novgorod: Novgorodlesprom (based upon several firms); Pskov forest committee (based upon 1 firm); NIPIEILesprom.

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